1992 · 9 北京
妇女在环境和持续发展中的作用
国际研讨会

Interregional workshop on the role of women in environmentally sound and sustainable development

VOLUME I:
PROCEEDINGS OF THE WORKSHOP

The State Science and Technology
Commission of the People's Republic of China
All-China Women's Federation

United Nations
Department of Economic and
Social Development

United Nations International
Research and Training Institute for
the Advancement of Women

United Nations
Department of Economic
and Social Development

中华人民共和国国家科学技术委员会
The State Science and Technology
Commission of the People's
Republic of China

United Nations
International Research and
Training Institute for the
Advancement of Women

中华全国妇女联合会
All -China Women's Federation

INTERREGIONAL WORKSHOP ON THE ROLE OF WOMEN IN ENVIRONMENTALLY SOUND AND SUSTAINABLE DEVELOPMENT

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Beijing, People's Republic of China
9-15 September 1992

Message of the Secretary-General

I would like to convey my greetings and best wishes to all the participants at this Seminar on the Role of Women in Environmentally Sound and Sustainable Development, and to express my warm appreciation to the Government of the People's Republic of China, and in particular to the State Science and Technology Commission and to the All-China Women's Federation, for hosting this meeting.

It is a matter of deep satisfaction to me that this workshop, coming so soon after the United Nations Conference on Environment and Development, is devoted to the theme of women and sustainable development. In every region of the world, the experience, knowledge, time and energy that women have dedicated to resources management has been crucial in sustaining community well-being. Their contributions to environmental management can be witnessed in countless success stories which are gaining international attention, and which can be used as models for others to follow. Indeed, there can be no sustainable development without taking due account of the critical role played by women in alleviating environmental degradation. Their experience, perceptions, and involvement represent invaluable assets in our quest for sustainable development. I therefore strongly believe that their considerable and significant efforts should be widely acknowledged and financially supported.

China, as the venue for the 1995 Women's Conference, which will coincide with the Fiftieth Anniversary of the United Nations, is a most appropriate host for this meeting. As a Member State which has demonstrated on numerous occasions its commitment to the goals of the United Nations and to the strengthening of the role of women in achieving sustainable development, and as a nation with a wealth of experience and talent, China is particularly well placed to contribute significantly and substantively to the outcome of this workshop.

I wish you all success in your deliberations.

Boutros Boutros-Ghali

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VOLUME I

PROCEEDINGS OF THE WORKSHOP

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PART I

REPORT OF THE INTERREGIONAL WORKSHOP ON THE ROLE OF WOMEN IN ENVIRONMENTALLY SOUND AND SUSTAINABLE DEVELOPMENT

Beijing, People's Republic of China
9-15 September 1992

INTRODUCTION

1. The Interregional Workshop on the Role of Women in Environmentally Sound and Sustainable Development was held at the Kun Lun Hotel in Beijing, People's Republic of China, from 9-15 September 1992.

2. The Workshop was organized by the Task Force on Women in Development of the United Nations Department of Economic and Social Development (UNDESD) in cooperation with the United Nations International Research and Training Institute for the Advancement of Women (INSTRAW), and in association with the State Science and Technology Commission and the All-China Women's Federation of the People's Republic of China.

3. Over 100 participants attended the Workshop, including 46 participants from the People's Republic of China. The list of participants is attached as Annex I.

1. Opening of the Workshop

4. The opening session of the Workshop was held at the Great Hall of the People in Beijing. The following dignitaries representing the host country attended the opening: Mme. Chen Mu Hua, Vice President of the Standing Committee of the People's Congress, and President of the All-China Women's Federation; Mme. Guan Tao, Secretary-General, All-China Women's Federation; Mme. Huang Qizao, Vice President of the All-China Women's Federation; Mme. Wu Yi, Deputy Minister of the Ministry of Economics and Trade; and Mme. Deng Nan, Vice President of the State Science and Technology Commission.

5. The United Nations system was represented by: Ms. Dunja Pastizzi-Ferencic, Director, Science, Technology, Energy, Environment and Natural Resources Division (STEENRD), Department of Economic and Social Development (DESD); Ms. Margaret Shields, Director, United Nations International Research and Training Institute for the Advancement of Women (INSTRAW); Mr. Kong Fannong, Director, Technical Cooperation Policy Division, DESD; Mr. John Mathiason, Deputy Director, Division for the Advancement of Women, Centre for Social Development, United Nations Office at Vienna; Mr. Arthur Holcombe, Resident Representative of the United Nations Development Programme in Beijing; Mr. Farid Rahman, Resident Representative of the United Nations Children's Fund in Beijing; Ms. Wafaas Ofosu-Amaah, representative of the United Nations

Environment Programme, and Project Director, WorldWIDE Network; and Ms. Binta Diallo, Senior Economic Affairs Officer, Office of the Under-Secretary-General, DESD. The full texts of the opening statements are included in Annex II.

6. The workshop was opened on behalf of the People's Republic of China, by Mme. Deng Nan, Vice President of the State Science and Technology Commission, a co-organizer of the Workshop. In her remarks, she observed that this Workshop, as an important follow-up meeting to the Miami Global Assembly on Women and Environment and to the UNCED itself, and as a prelude to the Fourth World Conference on Women, provided an excellent opportunity for women to strengthen their role in the process of achieving sustainable development. She cautioned, however, that severe prevailing environmental degradation was placing the future of humanity at grave risk, and that women were particularly vulnerable. The solution of global environmental problems could not be solved without the active participation of women, who were themselves undergoing a new phase of development and directing greater attention to societal, economic and political issues, and who were increasingly able to participate in macro-decision-making and management at all levels of society. She praised the UN Conference on Environment and Development as having opened a new stage in the development process in establishing a Global Partnership. In providing information on efforts being undertaken in China in terms of environmental protection, she also indicated that China had achieved considerable progress in developing its economy, and that the responsibility lay with China's women in furthering efforts towards environmental protection and economic development - in "propping up half the sky". She indicated that the Workshop, reflecting the expertise and experience of its participants, would be productive in its attempts to find further ways of involving women in the process of achieving and sustaining a natural ecological balance.

7. Mme. Guan Tao, Secretary-General of the All-China Women's Federation, then spoke in detail on the efforts being undertaken by Chinese women in furthering environmental protection in China, indicating that the present socialist system had been instrumental in empowering Chinese women, particularly at the political, social and economic levels, so that there was now a far higher degree of involvement by women in government, and a far greater rate of employment of women in a wider range of sectors in both rural and urban areas. Chinese women were now also able to enjoy new and equal opportunities for education, and have attained significant academic achievements. They had excelled in sports, and enjoyed a much higher degree of legal protection. She went on to describe a number of aspects of environmental destruction, their serious affects on women, and the considerable achievements of Chinese women in alleviating ecological degradation. These included: afforestation measures, and in particular the "Women's Green Project", launched by the ACWF which had resulted in 100,000 "women's woods"; protection of water resources; development of alternative sources of energy, including the design of methane-generating programmes, and development of solar and wind energy, undertaken by Chinese women scientists; and disaster relief efforts, particularly in relation to floods. Chinese women also played an increasingly active role in economic and social development programmes, one of which was a project to encourage rural women to learn technical skills to

improve agricultural production. The considerable achievements of the Government and women's federations throughout China in implementing a positive population policy were also cited. Chinese women scientists had made a particular contribution to the modernization of China, and in developing environmentally friendly technology through environmental research. The ACWF was moreover taking active measures to include the participation of women in the planning of the national economy, and in expanding the public education of women to enhance their awareness of global environment issues, and actions which could be taken to improve the environment. In concluding her statement, the representative of the ACWF emphasized that environment issues affected all humankind, and solutions would require global cooperation and commitment. She stressed the importance of involving women in this process. She welcomed all participants to return to China for the Fourth World Conference on Women, which would offer further opportunities for exchanges of views and information.

8. Ms. Dunja Pastizzi-Ferencic, Director of the Science, Technology, Energy, Environment and Natural Resources Division (STEENRD) of DESD, and Chairperson of the DESD Task Force on Women and Development addressed the opening session on behalf of the Under-Secretary-General of DESD, and conveyed gratitude to the organizers of the People's Republic of China for the excellent arrangements made in preparing and implementing the Workshop. She reiterated that the meeting was another proof of the global partnership advocated by the UNCED.

9. A message from the Secretary-General of the United Nations was then read to all participants, by which the Secretary-General expressed his profound satisfaction that so soon after the conclusion of the UNCED, this Workshop was devoting attention to the theme of women and sustainable development. He conveyed his full recognition of the critical role played by women in alleviating environmental deterioration, based on women's particular experience and perceptions, which was manifested in the innumerable success stories achieved to date. He also expressed his deep appreciation to the Government of the People's Republic of China for hosting the meeting, indicating that China, as a member State which had demonstrated its commitment to the goals of the United Nations and to strengthening the role of women in sustainable development, was the most appropriate host for this meeting, particularly in view of the fact that it would be the venue for the 1995 World Women's Conference.

10. The Director of STEENRD, DESD went on to describe some of the measures undertaken by the United Nations in furthering the advancement of women and in strengthening the linkages between environment and development - efforts which culminated in the UNCED and in Agenda 21. Much remained to be done, however, in giving proper meaning to the concept of sustainable development and in directing greater attention to the linkages between environment, population and development. She emphasized the need to consider the increasing world population as a productive resource, and that women, based on the innumerable success stories resulting from their own initiatives, could make an invaluable contribution in elaborating the concept of sustainable development, for which basic guidance

could be derived from the Nairobi Forward-Looking Strategies for the Advancement of Women Until the Year 2000. She expressed the strong hope that the momentum generated by the Earth Summit would be maintained, and that global environmental concerns would be viewed within the framework of other critical developmental issues. In concluding, she emphasized that this Workshop was an important step along the road from Rio to Beijing, the host of the forthcoming World Women's Conference, and that in elaborating policy guidelines and developing concrete project and programme proposals, the meeting would direct particular attention to effecting a transition from concepts to action.

11. In her opening statement, Ms. Margaret Shields, the Director of the United Nations International Research and Training Institute for the Advancement of Women (INSTRAW) expressed appreciation to the host country, and to the co-organizers of the Workshop - the State Science and Technology Commission, the All-China Women's Federation, and the United Nations Department of Economic and Social Development - for conducting the Workshop. She pointed out that this meeting was of utmost importance as a follow-up activity to UNCED and as a precursor to the 1995 World Women's Conference. She explained that INSTRAW had been involved in developing training modules on women, water supply and sanitation and on women and new and renewable sources of energy, which were now placed within a broader programme on women, environment and sustainable development. She explained that other programmes of INSTRAW were oriented towards sustainable development. For example, INSTRAW is seeking funding for a project designed to establish techniques for measuring the extent and value of unpaid work - an essential tool for future development planning. She concluded by stressing the urgency of translating Chapter 24 of Agenda 21 - describing global action for women towards sustainable development - from mere words into concrete action.

12. Mr. John Mathiason, Deputy Director of the Division for the Advancement of Women of CSDHA, Vienna, addressed the participants, and presented the objectives of the 1995 World Conference on Women. He expressed appreciation to China, which would host the Conference, and stressed that the Conference should be action-oriented. He added that developmental sustainability would be an important part of the Conference, and that much could be learned from the experience related to the implementation of the Nairobi Forward-Looking Strategies.

13. Mr. Arthur Holcombe, Resident Representative of the United Nations Development Programme in Beijing then addressed the opening session by conveying the support of his office for this Workshop. He explained UNDP's cooperative initiative with the Chinese Government in launching a new UNDP initiative - Capacity 21 - which was aimed at promoting and implementing China's national Agenda 21 strategy for sustainable development. He went on to describe various efforts being undertaken by UN agencies - UNDP, UNIFEM, UNFPA, ILO, the World Food Programme and UNICEF - in support of women in development. These covered such areas as income-generation, training in entrepreneurship, the production of gender-specific data, the improvement of township enterprises, training in literacy, management, industry, service, training in income-generating

activities in the farming sector, enhancing women's knowledge on child-rearing, childhood development and family education. He explained UNDP's Special Programme Resources (SPR), a financial allocation designed to assist UNDP field offices in obtaining information on WID capacities in developing countries, and to support the formulation of environmental plans and policies. In cooperation with UNIFEM, UNDP was developing activities with SPR funds in support of WID initiatives. He also explained the Global Environment Facility, co-managed by UNDP, the World Bank and UNEP, of which some US$ 60 million had been approved for China, including a large project on coalbed methane recovery. He described UNDP's association with PROWWESS, a project devoted to gender-specific activities in the water and sanitation sectors.

14. In the discussions that followed these presentations, a number of participants expressed their gratitude for such comprehensive papers, which were enriched with statistics and data on women. The participants conveyed their desire to learn more from the Chinese experience in order to improve the situation and status of women in their own countries. Participants wished to explore further possibilities of how the system in China enhanced women's status and gave them equality of opportunity. Some noted that the political systems in their respective countries were very different than that adopted in China, and they indicated a desire to explore areas of mutual cooperation.

15. His Excellency, Mr. Wan Li, Chairman of the Standing Committee of the People's Congress of China, received the participants on 14 September at the Great Hall of the People, and expressed his support of women's contribution to sustainable development, and a better understanding and cooperation among the people of the world. The organizers and Bureau of the Workshop expressed their appreciation for the honour of his presence, on behalf of all participants.

2. Election of Officers of the Workshop

16. The following officers of the Workshop were elected by acclamation: Chairperson - Mme. Deng Nan, State Science and Technology Commission, China; Co-Chairperson, Mme. Guan Tao, All-China Women's Federation, China; First Vice-Chairperson: Ms. Franciska Isaaka (Ghana); Second Vice-Chairperson: Ms. Martha Duenas de Whist (Ecuador); and Rapporteur: Ms. Samia Saad (Egypt).

3. Adoption of the Agenda

17. A representative of DESD then explained the objectives, agenda and expected outcome of the Workshop. She pointed out that the long-term objective was to explore approaches and modalities designed to ensure environmentally sound and sustainable development, particularly in rural areas, focusing on the role and involvement of women. The immediate objective of the Workshop was to identify, for future financing by donors, on a multilateral or bilateral basis, and eventual execution, replicable, sustainable and visible technical cooperation programmes and projects which would ultimately ensure that the role of women,

including their environmental perceptions were fully incorporated into the design and implementation of policies, programmes and projects related to environment and sustainable development, particularly in rural areas. Such programmes should take into account the linkages between women, environment, sustainable development and technical cooperation, and reflect the experience and needs of women in the technologies selected to alleviate environmental degradation. Obstacles such as socio-cultural constraints, which might impede women's full involvement in achieving environmentally sound and sustainable development, would also be identified. Within the framework of Agenda 21, the Workshop would direct attention to the development of programmes and projects to further the role of women in mitigating the effects of environmental deterioration with regard to specific substantive sectors such as: the role of women in environmental decision-making, planning and management; the interrelationship between women and population issues; the involvement of women in sustainable rural development; participation of women in the selection of ecologically viable technologies in relation to household energy; involvement of women in methodologies and technologies designed to achieve sustainable development of water resources; and methods of increasing women's involvement in environmental improvement through the promotion of a more active role of women in small-scale mining techniques. Particular attention would be paid to financing of the projects and programmes.

18. The agenda was adopted by consensus. The full text of the agenda is attached as Annex III.

4. Results and Follow-up to UNCED

19. A representative of DESD, in the absence of the representative of the UNCED Secretariat, described briefly the outcome of UNCED, and its implications in relation to the actual and potential role of women in sustainable development. She explained the main outcomes of the two major prior conferences on women and the environment convened in anticipation of UNCED, and outlined briefly the references to women in Agenda 21, notably in Chapter 24. While paying tribute to UNCED for what was achieved in support of women's role in sustainable development, she indicated that there were still many gaps to be filled and objectives to be attained, namely that in many instances, women were not considered as an integrated part of the main objectives of a number of relevant programme areas. She urged that attention be redirected to the Nairobi Forward-Looking Strategies, which was the first document to place environmental concerns in the context of overall development, and which stipulated that women should be recognized as equal and active partners with men in environmental management and in controlling environmental degradation. In concluding, she conveyed the hope that the issue of the role of women in sustainable development would have priority on the agenda of the 1995 World Women's Conference. (The written statement prepared by the UNCED Secretariat, and received subsequently, was circulated to participants).

20. The representative of UNEP and Managing Director of WorldWIDE Network, speaking on behalf of UNEP, expressed her gratitude to the four organizers of the Workshop,

and particularly to the Director of the Science, Technology, Energy, Environment and Natural Resources Division, DESD and to the Director of INSTRAW. She pointed out that less than fourteen weeks ago, the Earth Summit gave the world a blue print of what is essential for survival and justice. It affirmed with clarity the importance of women in realizing a more just and healthy world. She pointed out that this Workshop demonstrated the willingness of women to put their hearts, minds, and hands to the task of Agenda 21. UNEP was grateful to the organizers of this Workshop for such leadership, and was proud to be included. During the past seven years, UNEP had enjoyed significant assistance from governments and members of the UN family and had worked with non-governmental organizations, such as WorldWIDE. These partnerships were essential. The challenge to UNEP was to empower women to meet human needs by enhancing the capacity of each ecosystem to sustain life. Women and environment were the shadow subsidies of almost every society; both were undervalued. The Earth Summit challenged the world to revalue both. To describe women only as victims, while in far too many cases accurate, denied women, and thus men, the enormous capacity women have to change the world. DESD was well positioned to engage women fully in assessing the roles of economics, science, energy, technologies and other sectors related to environmental management and sustainable development. She concluded that this Workshop would complement aspirations held by every country in the world.

5. Methodological approaches towards strengthening the role of women in environmentally sound and sustainable development

21. The DESD consultant, in response to agenda item 5, presented her background paper entitled "Securing the Human Future: Towards Greater Support for Women's Role in Environment and Sustainable Development - Methodological Approaches towards Strengthening the Role of Women in Environmentally Sound and Sustainable Development". She stipulated the importance of approaching women's issues as a team effort, striving for people-centred strategies. She emphasized the need to recognize, and strengthen, women's knowledge and experience at the community, professional and national levels. Women from all levels must be highlighted as environmental managers. There must be a consultative, participatory approach, involving NGOs and grassroots organizations. Strong efforts must be made to reduce negative consumption by both industrialized and developing countries. A multisectoral, multidisciplinary approach must be adopted, wherever appropriate and relevant, in terms of involving women in development programmes. Access by women to appropriate technologies should be introduced, so that children were not the only "technological solution" for women. Synergism should be established, through the simultaneous involvement of participants at all levels in development efforts. Guidelines on women in environmentally sound and sustainable development should be set up, which should be adaptable and flexible through periodic review and training. Efforts must be action-oriented, while allowing sufficient time for adequate reflection and evaluation of the lessons learned. Women must be considered as true partners in the process of achieving sustainable development; there must be a balance between the use of resources and women's capacity to manage them.

22. The discussion which followed highlighted some of the issues raised.

6. Chinese experience in promoting the role of women in sustainable development

23. An overview was provided of eighteen case studies relating to sectors such as traffic noise pollution, information consulting systems, water resources conservation, environmental education, mineral resources exploration, marine hazard reduction, biological control technology, environmental improvement in mountainous areas, the use of drip irrigation, ecological agricultural construction, afforestation, linkages between fertility and environment, development of energy resources and use of woodfuel, waste water treatment, exploitation and use of powder ash, and insights into the role of Chinese women mayors in sustainable development.

7. Women, environment and sustainable development

24. The Director of INSTRAW introduced agenda item 7(a) on women and sustainable development. She described INSTRAW's background paper, entitled "Women and Sustainable Development", voicing also her support of the DESD background paper on methodological approaches. She gave a number of examples relating to the ten conceptual points raised by the DESD consultant. Following her presentation, the INSTRAW video on women, environment and sustainable development was shown to the participants.

25. The representative of the Population Division of DESD presented her paper on "Critical Links: Women, Population, Environment and Sustainable Development" relating to agenda item 7(b), explaining the basic problems responsible for the current critical situation as: currently practised development models which were leading towards environmental degradation; and the fact that environmental deterioration was due to consumption patterns and population growth which left little time for slow experimental adjustments to be made. After providing a review of linkages between women, population, environment and development, she suggested that the best approach to reinforcing women's role in environmental protection and sustainable development was that based on an analysis of the distinctive features of women's socio-economic status and on an understanding of the factors which determined their relative inability to control and exploit resource for their own benefit. Programmatic interventions which could be proposed for strengthening women's contribution to environmental protection should be based on a careful study of institutional and other constraints on women's activities. She described some measures for enhancing women's role as: improving women's status, ensuring their equitable participation in decisions regarding production and technologies to be employed, and assisting women in gaining more complete control over their reproductive role.

26. In the discussion which followed, some interesting points were mentioned.

27. For example, the participant from Mexico explained that Indian women used their morning urine as a very effective contraceptive tool.

28. The participant from Uganda further explained that the first sample of women's urine in the morning had high hormone concentration. The question, however, is: how can women be persuaded to use this as a method of contraception?

29. The participant from Pakistan pointed out that she was not familiar with this method, but she indicated that the UN had developed packages for fertility control. However, due to the illiteracy rate which was very high, and poverty, there was no control on fertility.

30. The DESD representative pointed out that the UN was developing modules to educate policy-makers and decision-makers on programmes that should be set up to enhance women's status in urban and rural areas.

31. The resource person on environmental health presented her paper, also in relation to agenda item 7(b), entitled "Women, Environmental Health and Sustainable Development". The environmental health of women in developing countries is adversely affected in large part due to the failure to consider the effects of development on women and to the failure to involve women in the design and implementation of sustainable development programmes.

32. Two thirds of women in developing countries suffer from anaemia and malnutrition, both of which are further exacerbated by the poverty in which these women live. In addition, their children's health is directly related to their health status. Malnutrition severely compromise resistance to viral, bacterial, fungal or chemical agents. Deficiencies in certain proteins, vitamins and essential nutritional elements reduce the effectiveness of the body's immune system to stave off illness.

33. Women's exposure to chemical pollutants is an important but little studied public health problem. These exposures interfere with the metabolism of nutrients and suppress the immune system.

34. Degradation of agricultural lands decreases the amount of productive land available for crops. The degradation affects women's health by threatening the on-going malnutrition and threatening the livelihood of the significant number of women who make a living in the agricultural sector. Exposure to agricultural pesticides induces immune system dysfunction.

35. Deforestation and soil erosion require women to spend more time each day gathering wood. This results in: (l) women preparing fewer cooked meals, which exacerbates their malnourished condition and that of their children and (2) supplementing or replacing wood with crop residues that create significant exposure to indoor pollutants produced from the burning of unprocessed solid fuels or biofuels used in unvented stoves for cooking and/or heating. These exposures frequently exceed the World Health Organization's guidelines and are the most important occupational health hazard for women in developing countries.

36. Women are the primary water gatherers in developing countries. Degradation and scarcity of water supplies requires women to travel farther to fetch water, leaving less time

for child care and food production and preparation. Approximately 80 percent of all sickness and disease in developing countries can be attributed to inadequate water supply and sanitation. Women are particularly susceptible to these diseases because of their frequent contact with, and presence around, water. Surface water is contaminated by untreated sewage and chemical pollution from industrial toxic wastes. These contaminants, respectively, cause diarrhoeal diseases that are the leading causes of death among children in developing countries and childhood health problems. The resource person concluded by recommending that women must be involved in the design of sustainable development programmes so that their knowledge, culture, needs, skills and opinions can be implemented in the design of a given programme. A measurable health outcome must also be identified.

37. In response to agenda item 7(c), the representative of the Transnational Corporations and Management Division of DESD presented her paper on "Increasing the Role of Women in Environmental Decision-Making and Management. She stressed the need to increase the number of women decision-makers, planners, managers and technical advisers engaged in promoting sustainable development, indicating that women had consistently been active managers of the earth's resources, especially at the community level. What had too long been lacking was the link between women's environment-related actions at the community level and their ability to influence policies, and project design and implementation. She cautioned that women's potential at the managerial and policy-making levels have remained largely unrealized, and studies have shown that the number of women in management has remained low in both the public and private sectors. She identified several structural and psychological barriers to increasing women's participation in sustainable development, and identified various strategies that might be explored to rectify these problems, including: examining the openness of governmental decision-making processes towards including women and overcoming gender bias; providing in-service training to up-grade women's skills; providing training to sensitize government policy-makers to women's needs; using mass media to enhance awareness; and recognizing the complementarity of roles of women managers and the local and national levels. She concluded by emphasizing that women must be considered as full partners in decision-making, and play an integral role in the design and implementation of environmental management programmes.

8. Country and regional experiences on women and sustainable development

38. In response to agenda item 8, a number of participants presented their case studies and country experiences to the Workshop. (The full texts of these case studies are included in Part II of the Proceedings.)

39. The representative of UNICEF explained his organization's activities and addressed the national policies in incorporating women in country programmes. He pointed out that UNICEF was paying particular attention to gender issues and participation of women as mothers and women themselves in health and population issues. He also pointed out UNICEF activities in China.

40. The representative of the US Council for INSTRAW stated that opportunities, experience and confidence had come together to create a crucial and historical moment in the history of women's movement. She quoted the ministerial declaration on environment and development held in Beijing in 1991, which stated that: "We also believe that poverty is the heart of the environmental problems of the developing world. The Conference in Rio, could provide new strength and momentum to the proposed launching of a huge world programme against poverty and its effect on the world environment." She stressed the need to define more specifically the concept environment and sustainable development. She explained that since 1980, INSTRAW had carried out some of the most important studies, workshops and seminars on "statistics and indicators and the informal sector". INSTRAW's work in both these spheres was beginning to be reflected in national accounting procedures.

41. The representative of UNIFEM pointed out that there was now a stronger recognition of the need for women to participate substantively in mainstream decision-making, i.e., that women must put forth their own priority of a development perspective that was environmentally sound and sustainable. UNIFEM has been guided by this concern in supporting the development of alternative models and strategies for effective participation of women, especially poor, grassroots women, in policy-making and development planning at different levels of governments. Projects in this area tested empowering strategies which could include the "demystifying" of the governments' decision-making and planning processes to grassroots women; and provision of leadership and lobbying skills to women and their organizations. UNIFEM was also providing assistance to pilot, innovative micro-level projects, including strategies in different areas of life management that protect the environment, and that had high potential impact and could also be replicated. In projects such as these, there must be systematic documentation of the model strategy being tested, and commitment by an institution to replicate the model, if successful. The vast knowledge of successful approaches of environmentally sound and sustainable development shown by women in many fora needed to be documented and disseminated. A coordinated effort among interested UN organizations could address this critical need.

42. The participant from Uganda explained the project on eliminating garbage from the markets. The analysis of the composition of garbage was 80 percent organic compounds which could be recycled as fertilizers. The Government had helped to recycle the plastics. A commercial bank also helped because the women's group provided statistics on the project. She pointed out that the project was funded by UNDP and ILO for $4,000 and they trained women to be better managers of environment. She invited all participants to attend the Regional Conference on Women, Peace and Development, being organized in Uganda in March 1993.

43. The participant from Thailand stressed the fact that the concept of sustainable development needed to be defined. In villages in Thailand, people lived a simple life in harmony with nature and wild life. People were self-sufficient and networked together for watershed management and conservation. However, now they were faced with modern ways and were trying to adapt their traditional practices. But capitalism and materialism were

inconsistent with their ways of life. The Government had a policy to be a newly industrialized country. It was building roads and tourist facilities such as hotels and golf courses in the primary watershed areas, rather than encouraging tourists to appreciated the beautiful nature. She stressed that industrialization and material development could not be sustainable, and that spiritual development should be encouraged. National policy should promote women's role together with men for sustainable agricultural and natural resources management. The Government of Thailand must also allow local people to gain land rights and citizenship for the tribal people.

44. The Deputy Director of the UN Division for the Advancement of Women noted that few women were found at the highest level of political decision-making in relation to environment and development. The decisions taken on both levels were crucial - both in terms of priorities for public investment and on regulations adopted. The lack of women at this level was paradoxical in a world where democratization was increasing, and where women had equal rights to vote and stand for political office, and thus constituted at least half of the electorate. He recalled the recommendation of the Global Assembly which stated that women should exercise their democratic rights and responsibilities to elect leaders, especially women who are responsive to women's needs and concerns with respect to environment and development. An increase in the proportion of women in decision-making to the target set by the UN of 30 percent by 1995 would eliminate many of the problems faced by women in general.

45. The representative of UNIDO pointed out that his organization was mandated to promote industrialization in developing countries. UNIDO was in the process of orienting its activities towards the implementation of Agenda 21. In this context, it considered the inclusion of gender issues as essential to the effectiveness of its programmes, particularly as they related to human resource development, capacity building and transfer of technology. In addition, many activities specifically targeted women. Among these were management training, entrepreneurship development and the development and dissemination of new and improved energy-saving and environmentally sound technology for rural women. A major constraint on small-scale entrepreneurs in general was that they lacked the know-how and access to technology, finance and information that could allow them to reduce pollution and increase the efficiency of energy and use of raw materials. However, due to women's limited access to technology, credit, education and training, they faced even larger constraints than men in this respect. Women were therefore even more likely to use unclean technologies. She concluded by explaining UNIDO's training activities for women entrepreneurs in the food processing industry, as well as the case studies on improved cooking stoves, small-scale waste recycling, assistance to rural women engaged in the production of low-cost building materials and assistance to rural women engaged in salt processing.

46. The representative of ESCAP noted that her Commission had some important activities emerging in the near future, which could contribute to efforts to have women and the environment recognized as a high priority. For example, a Workshop on Training

Modules for Women, Water Supply and Sanitation would be held in Bangkok in September 1992 for selected countries in the Asia and Pacific region. This workshop would be based on the multi-media training packages developed by DESD, INSTRAW and the ILO Turin Training Centre. She also noted that ESCAP was putting forward a project proposal to follow up that workshop with a series of "roving" seminars at the national level, to train trainers in using the water and sanitation modules. She suggested that these seminars could be held in the individual Asian countries during 1993 and 1994. She mentioned that ESCAP and UNDP would be holding a joint Regional Meeting on the Role of Women in Environmentally Sound and Sustainable Development in Asia and the Pacific from 27-30 October 1992 in Thailand. This meeting would endeavour, among other objectives, to include women's issues in the Universal Code of Environmental Conduct, which had been formulated by the NGO/Media Symposium on Communications for the Environment, held in conjunction with the Ministerial Conference on Environment and Development in Asia and the Pacific (October 1990).

47. The representative of FAO in the Asia and Pacific region explained the twelve on-going projects in the region, which emphasized poverty alleviation, and explained the micro-related perspective applied to agro-ecological zone units. The priority of poor households was not gender-equality; it was a question of survival. She stressed the need to look into economically viable aspects, particularly modern technological applications.

48. The participant from India explained her paper on technology "with a woman's face", facilitating interaction between the user, inventor and promoter in energy problems. She pointed out that in the state of Gujarat, the Gujarat energy agency had been responsible for the promotion of over 300,000 improved cook stoves, the construction of 20 community biogas plants, the promotion of 25,000 solar cookers, the undertaking of energy development in some 3,600 hectares of waste land, and the coordination of an integrated energy planning programme in 15 blocks. She briefly highlighted project experiences of the Gujarat Energy Development Agency, and other programmes in Gujarat, including the Motipura Biogas Cooperative which had been successfully managed by women for more than four years. She underlined that when planning women's participation, one must consider that there were 17 development programmes for rural women from different government departments, all pressing for their own priorities and trying to compete with each other. According to a study on rural priorities, the basic needs associated with energy - namely, domestic fuel, electricity, and street-lighting, ranked low in rural priorities. In view of this, a piecemeal approach would defeat its own purpose. An integrated methodology that cut across programme lines and reflected the experiences and needs of women, and did not further stress their already taxing daily routine, was therefore urgently required.

49. The representative of the International Council for Women explained the project profile on "The International Senior Corporation for Environment", indicating that the International Council of Women, through its eighty national councils, and their standing committees on aging were committed to the formation of innovative programmes to mobilize and use the valuable skills of retired volunteers. The various views of seniors as teachers and

organizers, programme executors of community programmes, were not only useful as such - but since these centres were usually already in existence and mainly self-funding, they were immediately available for action. She concluded by saying that the international senior corps for the environment, acting through ageing centres in all fora throughout the world, would harness immediately available skills, volunteer time, and revived commitment and self-fulfilment for the ultimate mission of the elderly. She pointed out that issues relating to the elderly in environmental education programmes were growing concerns. Use of seniors who had valuable knowledge should be used. She also explained senior citizens' projects and the need to replicate these.

50. The representative of ILO stressed four issues, namely: providing alternatives of livelihood for poor women living in degraded areas, ensuring genuine and full participation of women in rehabilitation and conservation programmes, strengthening institutional linkages at all levels, and sharing of experience. She reiterated the ILO objective of promoting equality of opportunity and treatment for both men and women, and the need to take fully into account the role of women as users and managers of environmental resources. She then elaborated on some of the ILO programmes, including those on the issue of women's access to and which is crucial to environmentally sound development. She also emphasized the interlinkages and the necessity to act at the three levels of policy-makers, intermediary organizations and grassroots groups, and the importance of sharing experiences across countries and regions. She concluded by stating that the process initiated by UNCED should not be seen as banning access to resources in fragile ecosystems, but as a process of searching and providing alternatives.

51. The representative of UNFPA pointed out that the use of various women's groups was most useful for successful project implementation. She defined three types of groups - senior women from the country; individual urban women who are economically viable; and rural poor in general. She stressed the need to advocate for training women to participate in the political system. The role of first ladies should be used as a role model and in empowering both urban and rural poor.

52. The representative of the Chinese Cultural and Philosophical Society explained the importance of pre-childhood training, and ways in which the support of men could enhance the participation of women. Concerning environmental protection, he pointed out that women were no less able than men and that we should take into account the importance of communications in solving a number of problems.

53. The participant from Ecuador, and INSTRAW focal point, explained the role and activities of her organization. She elaborated on a project that had been dedicated to training rural women in new and renewable sources of energy in Ecuador. The training started in August 1989, and rural women were trained in energy conservation, solar energy and in the use of various energy technologies, such as fuelwood and biomass. More than two hundred women were trained during this course.

54. The representative of the China Society of Female Mayors explained that women played an important role in society. Women's liberation in China was at a very high level. More than 200 women were mayors in China. Women aged between 40 and 50 years had a very high level of education and 80 percent were professors, lawyers, and engineers. She concluded by saying that in the next election, there would be more female participation in political discussions and that the women's liberation movement was supported by the system.

55. The participant from Bangladesh pointed out how much women could do in decision making in coastal conservation. She stated that Bangladesh was threatened by environmental stress. Environmental degradation was mostly due to natural disasters, of which women and children were the worst victims. She explained how a small group of women made grass mats, grew their own grass, which eradicated the use of plastic mats, and were the largest suppliers of mats in all leading emporiums in the capital. She explained her leadership experience as a Member of Parliament from a coastal constituency, and that she organized Members of Parliament from all coastal areas into a power lobby for coastal conservation, development and environment. The guidelines for a Master Action Plan which set her up as Chairman, were being followed in current activities. She was also working towards including women's participation in the country's Flood Action Plan, as water management issues related closely to women; it was essential to save endangered mangroves and other coastal ecosystems, as well as the marine environment, as was stipulated in Agenda 21. She also conducted seminars by using experts on coastal conservation. The participant brought a sample of the grass mat, which was presented to the participants.

56. The participant from Korea summarized her paper entitled "The New Wave of Environmental Movements among Korean Housewives". She pointed out that Korea had achieved remarkable economic and industrial growth in the past 30 years since the Government launched the first "Five Year Plan for Economic and Social Development" in 1961. The environment, squeezed in the cycle of over-production and over-consumption was deteriorating. Not much attention had been paid to the environmental consequences that such a rapid industrialization and urbanization could bring. A number of grassroots organizations had been emerging since the mid 1980s in order to promote and execute immediate environmental protection issues related to every-day life. She explained women's participation in the movement and how housewives convened on a weekly basis in order to learn about various social issues. Activities such as making soaps out of used frying oil, visits to farms, and recycling, were common.

9. Integrated approach to women and sustainable development of natural resources

57. The representative of the Mineral Resources Branch of the Science, Technology, Energy, Environment and Natural Resources Division of DESD presented his paper in response to agenda item 9(a), entitled "Environmentally Sound and Sustainable Development: the Case for Women in Small-Scale Mining." He explained that small-scale mining could be characterized as a producer of limited amounts of minerals from deposits with few known ore reserves, usually not amenable to mass or large-scale mining. All types of minerals could be

mined. Especially amenable to small operators were precious minerals (gold, silver, diamonds and gemstones) placers (gold, tin, platinum), rare earths, mica, tungsten and industrial or non-metallic minerals.

58. In many parts of the world, especially in rural areas, it was a seasonal alternative to farming to obtain additional income, as most small mines were in rural areas where people had small farms or plots of land. Small-scale mining provided a practical way to open up remote areas and initiate a money economy. It could form the basis for local processing and manufacturing industries. However, small-scale mining, especially artisanal or the most basic mining, could be brutalizing, often characterized by severe exploitation of labour, less than subsistence wages, appalling working conditions and disregard for health and safety. Uncontrolled mining affected ground and soils and drainage systems, and contaminated the air. Because of the use of basic mining methods, the recovery of the minerals, especially of gold, was only 30 to 40 percent. Women in mining in general participated as engineers, geologists, technicians, clerical workers, some as entrepreneurs, and some as miners. In small-scale mining, the majority of small mines, especially artisanal mining, were worked by one or two people, by families, and small groups or cooperatives. A good percentage were women and even children. Three model projects were proposed to assist these groups in raising their productivity and therefore their incomes by effective and practical mining and processing methods; by training women in mining techniques to serve as leaders or guides of their groups; by teaching and applying environmental control methods to reduce harmful effects; and by providing a focal point to obtain and coordinate social assistance available from international and national aid agencies.

59. The discussion focused on the role of women in small-scale mining. Questions were raised as to whether any health studies and statistics had been prepared on this aspect. The representative of DESD explained that such information was not available. The representative of Kenya pointed out that women in sub-Saharan areas suffered the most. They still walked 20 miles a day to fetch water. She raised issues on how to bring the traditional water-related technologies back to women. The issue of water quality was of utmost importance which must still be dealt with.

60. The representative from INSTRAW explained that the Institute had been conducting a number of training seminars on women, water supply and sanitation, and stressed the need to reduce the time of women in fetching water for income-generating activities.

61. The Chinese participant explained drip irrigation as an effective method of conserving water.

62. The representatives from ESCWA spoke on the project's diffusion of biogas technology in Yemen - a project that was jointly conducted by ESCWA and UNIFEM. The project was carried out in Al-Habeel village which was one of the poorest villages of Yemen. In this village, fuel in the form of fuelwood was collected by women who had to walk distances of more than 3 kilometres each day, carrying 15 kilos of fuelwood. During the

collection process, women were exposed to snake and scorpion bites. The fuelwood was burned directly in open stoves which produced harmful smoke, containing a considerable amount of toxic carbon monoxide. The introduction of biogas technology went through many phases which consisted both of surveys, as well as actual field operations. The project was implemented in a participatory manner and the participation of the local people in planning, monitoring and assessing the activities of the project was considered a primary factor in adapting the technology and in producing social change especially in relation to the conditions of women. Twenty-one biogas systems were constructed, serving 28 families out of 70 families in the village. The project had a direct impact on the country through its clearly identified outputs. Awareness among decision-makers at the national level regarding this renewable energy technology grew to such an extent that the reproduction of this technology was included in the national plan for the socio-economic development of the country.

63. The participant from Tanzania explained that her country had no funds to adapt research and development, and that technology was limited. She pointed out that manufacturers of technology should be invited prior to introducing a given technology. She gave an example of what happened when water was polluted by agricultural pesticides, and reiterated that the technologies must be designed to suit the requirements of the end-users.

64. The participant from Brazil expressed his concern over the discussions and pointed out the need to observe paradigm shifts over problems that this workshop was addressing. He also expressed his concern that women should not be talking and behaving like men but should rather be what they are in this type of forum.

65. In relation to agenda item 9(b), the representative of the Water Resources Branch of DESD provided a brief outline of concepts, policies, strategies and methodologies to ensure sustainable development through strengthening the role and involvement of women in water-related development projects. He presented some of the key concepts and principles that evolved from the meetings of various United Nations legislative bodies and technical conferences participated by policy-makers, professionals of national and non-governmental organizations. The paper emphasized the need for sustainability and environmental soundness in all water-related projects due to the interlinkages between water and other development sectors. In order to achieve this, integrated water resources management considered both the multisectoral and multidisciplinary aspects of water resource development that incorporated measures to ensure involvement of women as equal partners at all levels. The paper then provided an overview of the progress made in promoting women's role, and a number of potential topics or themes on which programmes and projects for promoting the role and participation of women were also identified.

66. The Director of DESD introduced the paper on the environmental impacts of new and renewable sources of energy, in response to agenda itemn 9(c). She gave a brief overview on the activities of DESD, the DESD WID Task Force and on-going projects being undertaken by the Department. She pointed out that women were confronted with several constraints in achieving full integration and participation in energy-related activities. She explained as an

example biomass technology and the benefits of women using this source in developing countries. She stressed that the paper was an overview of various sources of new and renewable energy which could used for further elaboration and application in the countries.

67. Following the presentations of the theme papers, the discussion centred on country experiences and comments relating to both agenda items 8 and 9.

68. The representative of NORAD in Bangladesh explained that NORAD was fully supporting women's activities in the field of water, energy and social forestry. She pointed out that there was a need for integrating women in all aspects of natural resources. The new rural development programme in Bangladesh consisted in two parts - namely infrastructure and training of staff and beneficiaries.

69. The participant from the University of Beijing pointed out the multifunctional aspects of women's involvement in environment. She said that they had sufficient experience in the area of clean energy, treatment of waste water and family planning. The training of women would enhance environmental awareness. She pointed out that biogas technology was a good means of achieving energy conservation, and explained that training in the areas of water and energy could be undertaken in demonstration areas.

70. The participant from Ecuador placed considerable emphasis on self-reliance for poor rural women, and expressed concern that despite advances in science and technology, the rate of poverty was increasing. Coordinated action, political will, and cooperation with the UN system could assist in achieving a long-term strategy. Responsibility could not be shouldered by poor people alone.

71. Another participant from the University of Beijing elaborated on the use of ecological agricultural products. She explained the activities of the Agricultural Department and stressed the need to introduce organisms into the environment.

72. The participant from Bolivia explained that because of poverty, women preferred immediate solutions rather than long-term perspectives. She pointed out that it was not planned to involve women in poverty alleviation projects, but it was essential for women to act. Women's involvement in development could not be separated from global development issues. She also stressed the need for training of women at all levels, particularly in the areas of science and technology, without which sustainable development could not be achieved.

73. The participant from Ghana explained that political will helped women to participate in the programme of decentralization for sustainable development which started in 1988. She said that there was a large gap between urban and underdeveloped rural areas. Through decentralization, more funds could be allocated to develop rural areas and to force rural people to go back to their villages. Financial, economic, and administrative decentralization focused on different states. This allowed people to participate in decision-making through a "bottom-up" approach. The transfer of power from the central government to district

authorities allowed competent staff to perform effectively and judiciously under transferred powers. Smaller assemblies allowed women to participate more effectively.

74. The participant from the Ministry of Transportation of China explained noise control and noise pollution. She said that 70 percent of roads generated noise pollution, and that children were three percent more vulnerable than adults to this problem. Noise pollution also hindered the health of the population. The problem was studied and supported by the Government, and noise shields had been installed, which reduced the level of noise in the streets.

75. The participant from Sudan elaborated on improved charcoal and cooking stoves. She explained the traditional ceramic stoves which were used in rural parts of the country, and indicated that 82 percent of Sudan's energy was from charcoal and 8 percent was used for household activities. Attempts were being made to reduce the consumption of charcoal. She further explained the improved clay stove, which was costly and therefore not used. The traditional clay stove was more widely used in Sudan.

76. The participant from the Water Control Centre of the Ministry of Water Resources of China explained that there was a shortage of water resources per capita in China, for both consumption and agricultural purposes. With the increase in economic growth and population, the shortage of water was more severe, and the quality lower. She pointed out that the effect of climate changes on water resources were very important for sustaining development. She also described the four principles deriving from the International Conference on Water and the Environment held in Dublin, and stressed the principle on women and water resources.

77. The participant from The Gambia pointed out that there was a need to learn more about sustainable development. A number of women were suffering from lack of water and food, and NGOs, as well as governmental agencies, would like to assist, but had not done so. She elaborated that work had been undertaken in well construction, but that training of women in water hygiene was crucial. She concluded by saying that if development was to be sustainable, people's needs must be addressed and based on available materials in a given country.

78. The participant from the Department of Agriculture of the University of Beijing, indicated that her department had made significant strides in developing women's projects in rural areas, and in cooperative extension work.

79. The participant from Tanzania pointed out that problems faced by women were well known. She stressed the importance of acting nationally, regionally, and internationally to transfer knowledge, and she pointed out that women must continue to remind governments of their needs and difficulties in fund-raising.

80. The participant from Mexico pointed out that in Mexico, attempts were being made to decentralize and privatize industries and government-owned facilities. Women had generated micro-industry. She explained a project in one village, Tres Marias, in which 600 women produced their own food. In 1985, the project failed because of the political situation in the country. Working in projects by integrating several environmental activities was highly successful. She concluded by saying that motivation was needed in order to enable people to continue efforts in environmental conservation.

81. The representative of UNEP pointed out that the goal of this Workshop was to come up with a portfolio of workable solutions designed, managed and implemented by women to alleviate environmental problems and advance sustainable development. This goal was parallel to the goals of WorldWIDE and the Global Assembly. The participants have been challenged to identify ways of educating the policy-makers about women's roles, identify ways of packaging and disseminating information on women's roles so that they reached a large segment of the public, ensuring that women use political systems and their voting rights to elect decision-makers who were sensitive to environmental management and women's roles. These were very important goals. She pointed out that an approach must be adopted which would use these as building blocks to design a new method of implementing projects that were mainstream. This also implied expanding networks such as WorldWIDE's network which had now grown to 7,500 women in 125 countries. Without the networking and dialogue between women and policy-makers, the goal of sustainable development would at best be illusive.

82. The participant from Pakistan pointed out that poverty affected 80 percent of the population in her country. Women were not involved in decision-making, but were more involved in household work and in taking care of cattle. Women enjoyed little support from the Government; only 13 percent of women were educated in Pakistan. Projects had succeeded in relation to immunization of children. NGOs were trying to promote women's health, and had been successful to some extent by setting up small clinics. She concluded by saying that her organization, the All-Pakistan Women's and Family Planning Association, had consultative status with the Government of Pakistan, and a B Category status with the United Nations.

83. The representative of INSTRAW explained her organization's activities in the fields of statistics, water, energy, and training. She pointed out that in 1989, INSTRAW had organized, in cooperation with the ACWF, a national training seminar on statistics and indicators on women in Beijing. She explained the multi-media training packages on water and energy, and a number of training seminars that had been conducted on these themes. She also explained INSTRAW's modus operandi - networking.

10/11. Development of guidelines and financing of programmes relating to women and sustainable development

84. Agenda item 10 was introduced by the representative of ESCAP, in her capacity as resource person. She provided a summary of the UNDP Handbook and Guidelines for Environmental Management and Sustainable Development, and explained that these guidelines could be used as a tool for placing women's issues on the environmental agenda. They were a useful means for formulating project proposals acceptable to UNDP and other donors. The guidelines focused on supporting governments in integrating environmental considerations into their development plans. They should enable users to identify environmental opportunities and constraints when pursuing economic and social objectives. They provided information on existing alternatives, but left the definition of the most appropriate techniques to the specific situation. She outlined the three sections of the Handbook: Promotion of Environmental Management; Operational Guidelines (which included tools for developing project proposals); and an Annotated Bibliography of Environmental Impact Assessment and Environmental Guidelines. She noted that the item "Women and Environment" was a minor sub-item in the overall framework, and suggested that perhaps the Workshop recommendations should include something on up-grading this item to a higher priority.

85. In relation to agenda item II, a representative of DESD spoke about financing sources for programmes to support the role of women in environmentally sound and sustainable development. She indicated briefly the difficulties in obtaining financing for programmes, particularly those involving women, owing largely to the world economic recession and the fact that decision-makers and budget planners still did not attach sufficient priority to women's issues. She described some of the bilateral and multilateral funding sources available, indicating that in preparing proposals, attention must be paid to criteria imposed by certain funding agencies. She cautioned that it was preferable to start from a realistic level, and that strategies should be adopted which would allow for expanding existing programmes or orienting them in new directions. She concluded by emphasizing that attitudinal changes must take place on the part of many governments, so that priorities were oriented less on military expenditures and more on issues relating to development and economic and social progress.

86. The participant from Egypt, and Rapporteur of the meeting, requested DESD to provide a list of funding agencies with full names, as well as guidelines on how to prepare and present proposals to funding organizations. She further requested clarification on what elements should be included and considered as prerequisites by funding agencies for submission. She reiterated the need to transfer knowledge and the necessity for women to interact and coordinate efforts.

87. The participant from the Ministry of Communication of China explained that 75 percent of women had said that they had experienced domestic violence. A survey was carried out in a large area of China with full support by the Government. As a result, a nation-wide network was established for the country.

88. The Director of STEENRD, DESD, presented the objectives and the purpose of the working groups, explaining that 50 project profiles/proposals had been prepared by various UN agencies, as well as by other institutions and participants, which were to be reviewed in the working groups. The aim of the working groups was to assess carefully these proposals, and to add new proposals, as appropriate, which might be readily marketable for funding by donor agencies.

89. The participants divided into four working groups: Group I - Policy Guidelines and Methodological Approaches; Group II - Natural Resources; Group III - Population; and Group IV - Decision-making and Management.

90. Moderators and rapporteurs of each working group were appointed as follows: Group I - Moderator: Dr. Speciosa Wandira-Kazibwe (Uganda); Rapporteur: Ms. Marcia Brewster (ESCAP). Group II - Moderator: Prof. Tang Xiaoyan (China); Rapporteur: Ms. Coumba Ceesay-Marenah (The Gambia). Group III - Moderator: Ms. Martha Duenas de Whist (Ecuador); Rapporteur: Ms. Salwa Babiker Tabiedi (Sudan). Group IV - Moderator: Ms. Nandini Gandhi (India); Rapporteur: Ms. Kathryn Block (DESD).

91. The task of Group I was to elaborate guidelines on the formulation of programmes and projects incorporating the role of women in environment and sustainable development. The group recommended that these guidelines be directed to governments, bilateral and multilateral donor organizations, financial institutions, non-governmental organizations and the business community. The Group recalled General Assembly resolution 46/167, which called upon organizations and entities of the UN system to coordinate and strengthen efforts to contribute to data collection and capacity-building, and urged the integration of women as active participant at all levels in the planning and implementation of programmes for sustainable development, as a pre-condition for achieving a balance between human needs and national resources. The guidelines are included in Volume II of the documentation emanating from the workshop.

92. Group II examined the various project profiles submitted in relation to the following items highlighted in Agenda 21: protection of the quality an supply of freshwater resources: application of integrated approaches to the development, management and use of water resources; managing fragile ecosystems: combatting desertification and drought; promoting sustainable agriculture and rural development; combating deforestation; and protection of the oceans and coastal areas.

93. The following recommendations were agreed by the group: (1) awareness should be heightened with regard to the potentially invaluable role of women in sustainable development, to achieve ecological balance; (2) the gathering and sharing of information should be intensified on women, water supply and sanitation, as well as on appropriate technologies, to that the needs and concerns of women are fully addressed; (3) linkages between national and grassroots levels should be strengthened to ensure the realization of the issues raised in Agenda 21; (4) more training seminars should be introduced, on the basis of

the INSTRAW/DESD multi-media training packages and PROWWESS training manuals and methodologies; (4) training programmes should be introduced for women at both the grassroots and national levels, on needs assessment, as well as on planning, monitoring and evaluation of programmes; (6) a training centre on women, environment and sustainable development should be established in China; (7) funding for field programmes and training activities, as well as for activities to protect women from environmental pollution, must be identified; (8) use of local expertise and knowledge should be expanded to ensure maximum sustainability, with inputs from international sources as needed; (9) successful projects should be disseminated through formal and informal education systems; and (10) networking of expertise, regionally and internationally, should be encouraged and expanded.

94. Group III reviewed the project proposals in the population sector with three clusters in mind: human settlements, statistics and data collection, and information and communication. It was generally agreed that while the proposals were not directly related to population issues, their outcome would nevertheless have an impact on the populations of developing countries.

95. The following general conclusions were reached by the group:
(1) governments of developing countries should make a political commitment to work towards population control, and should cooperate with non-governmental organizations in educating populations, particularly at the grassroots level; (2) the social environment should be improved to enable women to gain access to measures for environmental improvement, by raising the proportion of women decision-makers at all levels, and by raising the rate of employment of women, particularly in technical areas; (3) greater attention should be directed towards health care for children, particularly girls; (4) more emphasis should be placed on the relationship between fertility and the "social environment", bearing in mind that raising the educational level of women, their rate of employment and the level of their participation in social activities can improve their status and reduce fertility, and thereby reduce population pressures on the environment; (5) far greater attention should be directed towards the cost-effectiveness of programmes, so that scarce development financing is directed towards action-oriented projects based on prior experience, research, and thorough knowledge of target groups; (6) efforts to alleviate the pressures of population should go hand in hand with efforts towards a more rational use of natural resources; (7) the United Nations should ensure that the proceedings of expert group meetings on women and population are widely disseminated to encourage the development of internationally comparable indices and methodologies; (8) work on the establishment of an international women's data base (WISTAT) should be facilitated by strong support for the establishment of national women's data bases and the promotion of gender-disaggregated data whenever appropriate in national and sub-national data collection initiatives; (9) governments should provide the necessary education, social security, services and counselling for family planning, and in designing programmes, governments should be aware of cultural, social and other characteristics of the population; (10) to decrease the burden on women brought on by smaller families, international organizations, governments and non-governmental organizations should place particular emphasis on the use and promotion of labour-saving techniques and technologies, and should place greater importance on child-care services and day-care centres in support of women;

(11) men, as well as women, should be encouraged to learn about and participate in family planning and population policies; (12) in view of the effects of migration on developmental sustainability and on demographic structures at all levels, attention should be directed towards the need for urban sustainability if rural sustainability is to be achieved; (13) if resource management is to be successful, attention must be directed towards the need to integrate environmental health, maternal and child care, water and sanitation, the development and use of new and renewable sources of energy, access to and use of appropriate technologies, education, and employment of women; (14) the future evaluation and monitoring of sustainable and environmentally sound programmes should be formulated which address women's issues, cost-effectiveness, replicability and economies of scale.

96. In reviewing project proposals relating to environmental decision-making and management, Group IV elaborated recommendations as follows: (1) participatory research should involve, and build upon, local knowledge on women and on locally available human resources; (2) the assumptions underlying the development of programmes must be realistic and supported - i.e. agricultural projects must assume women's access to land and health projects must assume women's access to medical and health data; (3) training programmes must of necessity take women's participation into account, and must be designed to enhance leadership and management skills as well as address sector-specific environmental aspects; (4) research and training projects designed in support of women should extend beyond the accumulation of data and ensure the dissemination of that information and the practical application of information and knowledge gained.

12. **Discussion and adoption of Workshop report**

97. Following the presentations of the conclusions of the four working groups, the participants at the workshop discussed and adopted the report of the workshop on 15 September 1992.

13. **Closing of the Workshop**

98. The formal closing session of the Workshop was held in the afternoon of 15 September 1992.

99. The Chairperson, Mme. Deng Nan, welcomed Mr. Sung Jian, President of the Science and Technology Commission. She then gave the floor to Mme. Guan Tao, Secretary-General of the All-China Women's Federation, who expressed her satisfaction at the successful outcome of the workshop, and her appreciation to all organizers. She noted that the workshop had highlighted the significant role played by women in sustainable development, which had now gained greater attention worldwide, and that a consensus had been reached as to the indispensability of women's participation in the development process and in environmental protection measures. She also emphasized the fact that the workshop had constituted a link between the UNCED and the 1995 World Women's Conference, promoted a greater understanding and friendship among participants, and disseminated

valuable experience and knowledge. She envisaged the "prospect of harmonious development of human society".

100. The representative of the Division for the Advancement of Women, CSDHA, UNOV, pointed out that the successful conclusion of the workshop, which had put forth concrete recommendations and endorsed project proposals, boded well for the 1995 World Women's Conference.

101. The Vice-Chairpersons and Rapporteur of the workshop conveyed gratitude to the workshop organizers and to the host country, and emphasized the importance of the Chinese experience and success in solving a number of environment-related problems, largely due to the number of Chinese women in managerial positions.

102. The Director of STEENRD, DESD, pointed out that the nature of the closing ceremony was further proof of the strong commitment of the host country to strengthening the role of women in environmentally sound and sustainable development, and she particularly noted the presence of the President of the State Science and Technology Commission in this regard. She also indicated that the workshop had reflected global partnership between governments, non-governmental organizations, women's organizations and the United Nations system.

103. The Director of INSTRAW joined DESD in expressing warm appreciation to the host country and to all participants for their significant contribution to the success of the workshop, and she pointed to the need for close cooperation if goals are to be achieved. She reiterated INSTRAW's firm commitment, and joined other speakers in assessing the workshop as a first step from the UNCED towards the World Women's Conference of 1995.

Visit to factory

104. A field trip, organized by the State Science and Technology Commission, was undertaken by all participants to observe women's involvement in the management and operation of the Shougang Corporation, the second largest steel-producing enterprise in China, which is also environmentally advanced. Following this visit, a cultural programme was arranged, and a dinner was hosted by the Corporation.

PART II

BACKGROUND PAPERS AND CASE STUDIES

A. BACKGROUND PAPERS

Securing the Human Future: Towards Greater Support for Women's Role in Environment and Sustainable Development *

Methodological Approaches Towards Strengthening the Role of Women in Environmentally Sound and Sustainable Development

(Agenda item 5 of the Provisional Agenda)

An Overview
Prepared for the Department of Economic and Social Development
by Ruth S. Finney Hayward, Consultant

Foreword

This paper provides an overview of a wide range of issues related to women, environment and sustainable development, and it draws heavily upon the accumulated knowledge deriving from studies on women in development.

The paper attempts to point the way to the need for broadening awareness and developing new methodological approaches to sustainable development.

1. Introduction

1.1. The Search for Sustainable Development

1. The United Nations Conference on Environment and Development (UNCED), the Earth Summit, held in Brazil from June 3-14 June 1992, demonstrated that the majority of nations need and are committed to find ways to manage more effectively natural resources so that future as well as present generations can benefit from them. If sustainable development is to be realized, the achievement of such a balance point is necessary, as was called for in 1987 by the Brundtland Commission's *Our Common Future: Report of the World Commission on Environment and Development*. Now UNCED has re-emphasized the importance of the ongoing search for sustainable development.

2. New policies and practices in development are therefore required, and are being suggested from many quarters for use at global, national and local levels. In some cases these would require changes which may appear to be against the immediate interests of some powerful groups, although the changes may actually promise longer term benefits for all

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* The views expressed in this paper are those of the author and do not necessarily reflect the opinion of the United Nations.

concerned.

3. More participatory, "human-centered," inter-disciplinary and synergistic approaches to development have been advised, along with more attention to linkages between macro and micro level concerns. In this context, lessons learned from women-in-development (WID) and from analyses of gender roles in development take on a new importance because they draw on work that has featured the above and similar approaches as key methodologies, and because they reflect both substantive and policy issues which are, in many cases, directly linked to environmental concerns.

1.2. The Earth Summit and Gender Roles

4. Many of the cross-sectoral and substantive issues addressed by UNCED and featured in its Agenda 21, have clear linkages with gender issues. This is particularly the case for rural women's roles which involve so many domestic and productive activities. It is well-recognized that rural women have not been taken enough into account or supported adequately in the development process, and that as a consequence there have been costly mistakes which put women, communities, the environment and even the whole prospect of development at risk. With growing urbanization, and ever increasing migration, the role of urban women, so far not so prominent in women's studies, should be given greater attention.

5. As UNCED made clear, once again, a balance between population growth, human needs, and natural resources is not being achieved; poverty is actually increasing in many developing countries; and many attempted technological solutions are proving inadequate or even harmful. Environmental degradation and the burdens of the debt crisis underline the inadequacy of those development practices which have emphasized short term gains. The paradigm of man-over-nature or man-subservient-to-nature has prevailed rather than that of man-in-harmony-with-nature - the ancient wisdom. Losses to both people and the environment are the result.

6. A development approach that would explicitly address women's needs and draw on their knowledge and skills would take a longer-term view, and demand a people-centered approach, (although a people-centered approach does not automatically include women.)

7. In fact, explicit and systematic attention to women as well as men in the development process is an efficient means to guarantee that the invisible are seen, that the voiceless are heard, that the vulnerable are empowered, that technology does not overwhelm the human, that harmful effects are limited. All of this is particularly important for environmental issues and concerns, and absolutely essential for human-centered ones.

1.3. Strengthening Linkages between Rural Women and the Environment

8. Rural women's important roles in agriculture throughout the developing world, their associated knowledge of various plant and animal species (and of requirements for plant

propagation and animal breeding, as well as for plant protection and animal health), their domestic responsibilities to provide water, fuel, fodder, food, crafts, clothing and child-care, their employment in a variety of sectors, their community activities, concerns and commitments, and their fertility all affect the environment. Obviously the environment also influences women's activities, health, and potential. In short, women both change the environment and are changed by it, sometimes in small ways, sometimes in more consequential ones, across a broad spectrum of subjects.

9. Efforts are, therefore, urgently required to strengthen those aspects of women's roles, activities and capacities which contribute to a healthy environment and sustainable development, and to limit development practices which harm the environment and women.

1.4. WESD As A Pre-Condition for Successful UNCED Follow-up

10. Such efforts can also advance the implementation of key UNCED resolutions and recommendations far more effectively than would otherwise be possible: women's integration is proving to be a pre-condition for reaching many development goals. The extent of women's knowledge, interests, and activities that depend on or affect the environment is such that this is likely to be the case here too.

11. There are many far-sighted strategies, principles and recommendations about the importance of women's participation in activities to safe-guard the environment and promote sustainable development, some of which were set forth even before UNCED itself, and which have been reinforced by it.

1.5. Building on United Nations' Resolutions and Strategies

12. For example, the United Nations General Assembly in resolution 44/228 called for the development of human resources, particularly in developing countries, for the protection and enhancement of the environment. The gender dimension was recognized by the 53rd meeting of 4 September 1991 of the Preparatory Committee for the United Nations Conference on Environment and Development, as a vital part of this initiative. It noted that already in 1985, the Nairobi Forward Looking Strategies for the Advancement of Women stated that national and international emphasis on ecosystem management and the control of environmental degradation should be strengthened and women should be recognized as active and equal participants in this process. The Preparatory Committee requested the Secretary-General, in a world-wide collaborative effort, to ensure that women's important roles and means to support them were reflected in the Brazil Conference and its results as a cross-cutting as well as a mainstream issue. Furthermore, it requested that mechanisms be established which would, *inter alia*, lead to a global goal in Agenda 21 to promote the effective participation of women in knowledge generation, decision-making and management at local, national, regional and international levels; and to specific actions in each sectoral and cross-sectoral area of Agenda 21 that would have beneficial impacts on women.

13. GA resolution 46/167 calls upon organizations and entities of the United Nations system to coordinate and strengthen efforts to contribute to data collection and capacity-building in the field of women, environment, population activities and sustainable development, and urges the integration of women as active participants at all levels in the planning and implementation of programmes for a sustainable development. This resolution requests the Secretary-General to include a section on the role of women in environment and sustainable development in the report on effective mobilization and integration of women in development to the 48th session of the General Assembly.

14. Much remains to be done, and concrete action is now needed, particularly with regard to women's roles as managers and care-takers of scarce resources.

15. In the past, men's stereotypic roles as exploiters of the environment through technology tend to have been strengthened without due concern about possible negative results, or support for women's viewpoints if these were against commercial interests. Some conflicts such as the well-known Chipko Movement in India have proven the importance of grass-roots movements, involving both men and women in the protection and conservation of natural resources.

1.6. The Time for Concrete Action and Local Participation

16. Some feminist authors have attracted attention to the importance of the so-called "feminine principle" in development. This is not, however, the sole prerogative of women, although it is obviously associated with them. For example, Vandana Shiva's influential Staying Alive, calls for men as well as women to embrace " the feminine principle," and thereby nurture the earth; William Anderson's more recent Green Man, The Archetype of Oneness with the Earth (1991) calls for the reawakening of Mother Earth's male counterpart, Green Man, who appears in some ancient folklore and art, but who was being forgotten as men's roles stressed control over, rather than oneness, with the environment. Whether male or female-oriented, the principle is one of social mobilization for sustainable development.

17. This brings us to the major theme for this seminar and thus for this paper: the importance of recognizing and strengthening those aspects of gender roles which can best contribute to efforts to achieve balance a between human needs and natural resources over time, -- to sustainable development, in brief -- and the ways to do so. This paper is therefore intended to highlight some of the linkages involved, the promising methodologies to address them, and ideas for action that are in line with UNCED's results.

2. Towards Project Ideas and Methodologies for Action

18. Accordingly, the main purpose of this paper is to stimulate the identification of, and follow-up on, related project ideas suitable for individual country situations, as well as for technical co-operation among developing countries and for inter-agency co-operation, on the

theme, "Women, Environment and Sustainable Development (WESD)". The projects will also attract international funding for the areas covered.

19. This approach is meant to be in keeping with the emphasis which UNCED placed on the urgent need for action on the environment which also takes into account the needs and contributions of major groups, especially women.

20. Project ideas will be related to selected cross-cutting themes and substantive issues from UNCED. These are discussed in sections below after a brief review of some changing trends in development thinking that make the linkages between women's roles, the environment and sustainable development particularly timely issues to emphasize.

21. An Annex, "Operational Guidelines for WESD Project Ideas for Possible UN System Technical Co-operation in the Follow-up to UNCED" is included as the basis for practical discussions and further development by participants who are ready to engage in concrete follow-up action to UNCED, related to WESD at the policy, institutional and community levels.

2.1. Selected Topics

22. The topics to be covered by this paper are: poverty alleviation, which will include a discussion of population issues; technology transfer (and bio-technology); bio-diversity and as well as protection of the atmosphere, land resources, and freshwater resources. These sections will be followed by two of general relevance: financial resources and managing the environment over the generations. The need for changes in policy and related training are addressed throughout. Papers to be presented by DESD and other participants at this workshop will give some project ideas in more detail. Wherever possible, the orientation of these other papers has been taken into account in the discussion and examples below.

2.2. Key Methodologies

23. The process of project development as consultative, people-centered, and interdisciplinary is emphasized throughout. A process which involves local participation and sufficient time to identify the real core problem(s), can guarantee or deny the appropriateness of a project idea in a given context. An example of one method to do this will be briefly described in the last section of this paper for consideration and possible use by interested parties.

24. Of course, any adaptation of the project ideas and methodologies by a country or group of countries should require the involvement of local women and contribute to their empowerment in addition to any other desired goals. Exchanges of relevant experience among developing countries in the spirit of TCDC have also been called for by UNCED, along with the methodologies mentioned above, if action is to move forward and involve developing country partners in a sustainable manner.

2.3. The Management of Paradox

25. As development flows more and more from a consultative rather than a narrow bureaucratic process, it demands greater co-operation among relevant and interested parties to effect the integrated and synergistic approaches which are needed. There is a need, then, for more flexibility and improved co-ordination at the same time among entities in the United Nations system. This appears to be paradoxical. The "management of paradox" --how to be both more flexible and responsive and yet more co-ordinated and obliged to do one's part -- poses a great and urgent challenge for all concerned. Improved joint planning, communication, co-ordination mechanisms and accountability methods can all contribute.

2.4. Our Larger Purpose

26. This paper and this meeting are nothing less than a call for co-operative ways to give birth to the human future at the very time when technology, if used without enough consideration for present and future human needs, could destroy the planet as a fit habitat. Supporting women's knowledge and management role in the environment and in sustainable development, and supporting a developmental orientation of grassroots movements, are thought to be ways towards more healthy human communities and a more healthy planet. They also promise a more constructive development assistance process in keeping with changing values and methods in the development community.

3. Background: Changing Development Trends

3.1. The Human Development Ethos and Sustainable Development

27. In the eighties, the development community increasingly emphasized that the ultimate goal of development was to improve the quality of human life. It recognized that increased production and an improved macro-economic picture were not ends in themselves or even sufficient means to ensure benefits for the poor. It also recognized, spurred on by the Brundtland Commission's report, that resources were limited, that thoughtless development could exhaust them, that benefits for some did not guarantee gains for the majority or for the future. Themes such as people's participation, structural adjustment with a human face, food security at the household level, social forestry and sustainable development became commonplace in development thinking. Part of the idea of sustainable development was that the developing countries should have greater control of, and benefit from, activities and resources involved.

28. These changing themes and concerns reflected the general dissatisfaction with "trickle down" approaches to development and a quest for "human-centered" ones. Accordingly, all types of organizations tried to find ways through which they could enable vulnerable groups to participate more directly in development planning, contribute with satisfaction to its implementation and receive valued benefits over time. These should be balanced, it was thought, with concern for the environment and avoidance of resource depletion.

29. Now in the early 90's, even more attention is being given to issues and approaches relating to quality of life. For example, a human development framework for development is being promulgated by UNDP; human rights are being discussed at the highest levels in the United Nations and related organizations. It is obvious that the debate surrounding environment and sustainable development calls for new developmental ethics and a new system of values.

30. In this context, sustainable development can be seen as a human-centered approach, as well as one which respects nature: limits on consumption of natural resources would protect the rights of yet unborn generations along with those of today's citizens. However, the fight against poverty, for the present, is at the core. Through sustainable development, natural resources are to be maintained at levels that will permit regeneration, ensure quality and meet future as well as present needs.

31. A workable formula for this is not easy to find, particularly where there are vested interests, where governments may lack the necessary will, and where local peoples' rights and viewpoints are over-looked, uninformed. Sustainable development thus depends on respect for human beings as well as for the natural environment; otherwise neither the cooperation of local people nor benefits for them can be ensured over time. The Brundtland Report's call for more control over development by developing countries began to be reflected in new policies as a key aspect of the sustainable development approach, and compatible with women's empowerment as well.

3.2. The Contributions of Women-in-Development (WID) Work

32. At the same time, work on "women- in-development" (WID) highlighted the necessity for means to, and returns from, giving women's roles in productive as well as domestic spheres explicit attention alongside those of men. Analyses that took gender roles into account often revealed the previously overlooked centrality of women's activities in many fields. The idea grew that if women's needs were met in developing countries, their capacities strengthened, and their participation ensured, this would benefit them directly and bring other development goals within reach.

33. As was stated above, women-in-development was identified in many cases as a pre-condition, in fact, to achieving other goals. In short, work on women in development or gender roles provided important examples of useful approaches and successful outcomes that could be incorporated into other technical fields. This was a very different approach than that which assumes it is not necessary to address women in development because they are automatically benefited anyway.

34. For example, once women's major role in Third World agriculture was documented, it was difficult to see how food security at the household level, or nutrition, could be substantially improved unless and until women were supported as farmers in the development process. Statistics about the proportion of women active in agriculture around the world were

compared with figures about the percentage of women receiving direct inputs to improve their efficiency. The gaps remain dramatic. Also, information about the proportion of poor households that were women-headed, *de facto* as well as *de jure*, contributed to the conclusion that alleviation of poverty and development with equity would **depend on** giving women as well as men access to income-earning opportunities, to credit and to marketing improvements, starting with informal sector activities.

35. In the 80's there was a trend towards emphasising arguments of efficiency rather than equity as reasons for women-in-development. Most organisations in the late 80's and the early 90's also called for "mainstreaming" rather than separate efforts on behalf of women. It has proved difficult, however, for many organisations to identify successful "mainstream" projects which incorporated in their design from the beginning a direct and active concern for women as well as men, based on knowledge about pertinent gender roles and responsibilities.

36. The same difficulties will likely apply in the case of the environment unless linkages between women's roles, the environment and sustainability are understood in general, explored for various sectors and topics, and then genuinely regarded as a pre-condition for success, which is more and more the case for agriculture and forestry projects.

37. At the same time, it is unacceptable to think of women primarily as a resource for development when development is meant to serve people, not the other way around. The effort to define the linkages involved in WESD, then, calls for consideration of (a) the impact of the environment on women, and how to make this as positive as possible, and (b) the existing and potential impact of women on the environment, and how to make this as positive as possible. Efficiency, equity and the likelihood of "mainstreaming", and sustainable development can all be increased as a result.

3.3. Linkages between Women's Roles, the Environment and Sustainability

Initial efforts

38. Even before preparations began for UNCED, the development community recognized the interrelationship between women and the environment, and its importance in the development process. For example, among the multi-lateral organisations, UNFPA had long called for more attention to the need for balance between population growth and natural resources; WHO had identified negative effects on women's health caused by certain environmental conditions; UNEP, FAO and IFAD featured efforts to recognize and support women's roles in forestry and farming; INSTRAW and UNICEF emphasized the importance of women's roles in drinking water and sanitation projects; UNIFEM, ILO and others stressed the importance of developing technology to reduce rural women's labour, of providing alternate energy sources for domestic use, and of improving women employees' working conditions; UNDP and the World Bank supported a variety of projects related to all the above, whether for direct execution or for implementation by other organisations.

Despite these many separate activities, major lessons learned over-all about women and the environment in the development process were not consolidated.

A Sharper Focus for and from UNCED

39. As preparations for UNCED intensified, there were more efforts to analyze what had been learned, at least for particular subjects or geographic areas. For example, the World Bank analyzed lessons learned about women and the environment in Sub-Saharan Africa, UNIFEM reviewed projects from three regions, and the DESD Task Force on WID consulted on this Workshop.

40. The links between women and development, or gender issues, and the goals of a healthy environment and sustainable development have become much more evident after UNCED and all the thinking that went into it. At the most general level, it has been made clear that women have important active, and even managerial roles vis a vis the environment, as well as passive ones in which the environment affects them.

41. The principles set forth in the Rio Declaration on Environment and Development emphasize, interalia, that "women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.

42. Programmes which can be developed, based on Agenda 21, will be discussed at this workshop.

Defining Specific Inter-relationships

43. More specific inter-relationships have also been explored for various cross-sectoral and substantive issues. The effects of women's responsibilities to gather fuel and provide domestic energy, to obtain water, to produce and contribute to daily food, to provide income,--and all under frequently harsh circumstances in which women lack access to resources which would make their work more efficient, including appropriate technology, transport, up-to-date training, and credit; and the importance of women's knowledge about local plants and animals, as well as the environmental which influence them - all these have been the linkages addressed most consistently among the various organizations in the multilateral and bilateral community.

Re-intensified Efforts Among Donors

44. Still, it would be all too easy to have women's relevant roles, their interests, needs and capacities, and their knowledge overlooked as the spotlight shines on the environment. In fact, some donors, - such as DANIDA and FINNIDA, - have organized staff training to keep WID on their agendas precisely so that its inter-relationship rather than competitive

status with new topics such as the environment can be better understood. Related training is repeatedly called for by donors and others as a means to ensure new approaches to WESD.

An NGO Priority

45. The NGO community is also taking a close look at, and strong stand on, WESD. For example, with the idea of influencing the agenda for UNCED, and in preparation for the NGO Global Forum in Brazil, the Senior Women's Advisory Group of the UN Environment Programme (UNEP), followed by The Women's Environment and Development Organization (WEDO), together with the Women's Foreign Policy Council, organized influential back-to-back meetings in Florida in November 1991 - the "Global Assembly on Women and the Environment" and the "World Women's Congress for a Healthy Planet." The first featured success stories from organizations and countries around the world; the second presented "witnesses" about women and the environment issues, followed by an international panel of prominent women judges to draft conclusions compatible with a Code of Earth Ethics with a Women's Dimension. A "Women's Action Agenda 21" was issued for consideration by the Fourth Preparatory Committee for UNCED, which met in March 1992, in New York.

46. The Women's Action Agenda called for: relief from poverty which forces women in many countries to over-use scarce natural resources; reduced rates of consumption, particularly by those in developed countries, along with more ready access to family planing for those who want it; new technologies appropriate for women's tasks; and messages about health risks posed by pesticides and wastes. The Women's Action Agenda also demanded respect for women's traditional knowledge about the environment regarding, for example, plants, seeds, and natural pest-control methods. It highlighted the importance of including women in all levels of decision-making about the development process, and the urgency for issues regarding women and the environment to be considered seriously by policy makers at both international and national levels.

4. Ideas for Follow-up of UNCED Results

47. Most of the ideas about WESD reviewed above from the some of the work of the United Nations, its sister agencies, donors and NGO's have been supported and strengthened as a result of UNCED, and many found their way into its discussions and results. The rest of this paper elaborates on more linkages and highlights ideas and methods to pursue them for selected topics from Agenda 21 which appear to be among the most promising for follow-up regarding WESD.

48. The implementation of Agenda 21 is a highly challenging task, calling for joint action by governments, the international community, NGOs and the private sector, and requiring, above all adequate financial resources. A careful analysis of Agenda 21, undertaken by DESD 1/ highlights the major tasks and the need for concerted efforts.

4.1. Poverty Alleviation

49. This is a cross-cutting issue of major importance in Agenda 21.

4.1.1. The poverty-environmental degradation-poverty cycle

50. Poverty can drive people to actions which degrade the environment, and an environment that has deteriorated deepens poverty. Current concern for the environment has heightened the development community's long-standing interest in alleviating poverty. The success of intensified efforts would bring multiple benefits, breaking the cycle of poverty, benefiting the rural poor and protecting the earth. Failure to break the cycle of poverty will obviously have devastating effects on the most vulnerable populations.

51. It is unfortunate but true that poor women, despite all their strengths, contributions and coping capacities, are extremely vulnerable in the development process. This is so because they are in many places the poorest of the poor. They are rarely consulted, nor are their interests taken into account in the development process, and they usually lack power within local communities and within the governments and institutions involved in development assistance.

52. In many poor rural areas, land and water resources have been damaged because the few sought short-term gains. Soils have been eroded or depleted, water has been polluted, sometimes by run-off of fertilizers and pesticides applied in agricultural projects and promotions. In unprotected watersheds, water sources have decreased, dried up, or been fouled, as people and animals cut or damage trees and plants. Awareness of, or due regard for, long term environmental and social benefits have too often been lacking. Governments may even have encouraged short-term exploitation in order to earn foreign exchange needed to reduce the debt burden. Until recently, there has also been ignorance on the part of many governments about the need for environmental accounting, and "trickle-down" approaches have been inadequate. Support has also been lacking for more environmentally sound approaches and for the concomitant policy and management changes, which may be expensive in the short-run.

4.1.2. The debt burden and WESD

The heavy burdens placed on developing country governments by the debt crisis can cause them to use natural resources at a more rapid rate than would otherwise be the case. The tendency has been to emphasize cash crop production for export; to alienate labour from producing goods and services for those at home; to provide fewer benefits for workers; and to distribute less of the national budget to education and health, the "soft sectors," than would otherwise be the case.

54. Poor women are affected in several ways by the urgent need for foreign exchange in developing countries. In turn, the environment and the prospects for sustainable development are affected.

4.1.3. Negative impacts on work-loads, time, money and health

55. First, they are often expected to provide labour for cash-cropping or manufacturing at lower wages than men would receive, and to do so in addition to fulfilling their "domestic" duties, which usually include producing food from their own crops, kitchen gardens and animals. If this is not possible, they will probably try to purchase food with whatever money they can earn.

56. It appears that it is women who are very often expected to provide for the daily family needs rather than the intermittent and sometimes larger expenses. To have cash of their own, women often take seasonal work, and/or enter the informal sector. They may even migrate to cities to do so, perhaps leaving children behind and intending to send money back for their care.

57. Because members of traditional households are likely to have very different responsibilities according to gender, women and men do not always put their money in "one purse" but spend it in very different ways, which are accepted and even expected. Where this is the case, any shortfalls which women face are not necessarily covered by men in the household and vice versa. Family nutrition and health may suffer as a result.

4.1.4. The most vulnerable cases and circumstances

58. It is clear that there is simply not enough time in a woman's day for both her "productive" and "domestic" tasks, yet her time is under-valued. This tendency is exacerbated by the demands of the debt crisis, which is injurious to the environment because it encourages exploitation of nature for short-term commercial returns. It also brings extra pressure on, and exacts an altogether unacceptable toll from, poor women precisely because their responsibilities so often directly involve natural resources or poor working which degrade nature and women. The situation is even worse for women who are household heads, whether *de facto* or *de jure*.

59. Women's health may be endangered from hazardous working conditions, including exposure to toxic chemicals or injurous procedures and equipment, which can typify agriculture or industry when those in charge are cutting costs in order to increase production - a situation which the debt crises helps to create.

60. Children often work alongside their mothers or by themselves in the fields or in the informal sector. They are more vulnerable than adults to harm from chemicals and other pollutants, but often lack adequate protection. When women are pregnant and their unborn children are exposed to risk from the environment, the effects can be even more negative.

Too often, poor women are unaware of the risks involved for them and their children, or they may not see any choice, given desperate circumstances, but to accept harmful working .

61. Governments may look to women to provide the social services that tend to be cut when budgets are constrained by high debt-servicing costs. It is evident that the opportunity cost of women spending time on inadequately compensated work and under poor conditions can be very high in terms of family as well as personal well-being. Nutrition and health are both likely to be negatively affected. In addition, wherever HIV/AIDS infection rates are high or growing, and debt-ridden governments cannot afford the costs of minimal, let alone extended care, it is very likely the women who are expected to care for the sick and dying and to spend a disproportionate amount of time mourning.

62. Poverty and powerlessness -- made worse by the debt crises and the environmental problems these engender -- can alienate women from the earth and its bounty. Where their land-use rights to the best and most convenient land have been lost for the sake of cash crops which are primarily under the control of men, their own and family well-being is frequently in jeopardy.

4.1.5. Some Potential Solutions

63. Access to land, to credit, to technological packages that include up-to-date advice, methods and means, to improved transportation and better working and employment opportunities are all important for rural women if they are to fulfil their domestic and productive roles, and to do so in "environmentally friendly" and healthy ways.

64. Where rural women have turned away from their reliance on the land or on animals for their own or for family well-being, they clearly need support for income-earning possibilities, either as self-employed or hired workers. They also need circumstances and laws that protect them from environmental hazards and abusive practices, along with information about risks to them and their children, their rights and any available services or advocates.

65. Women are dominant in marketing in many countries but may lack the capital, the means of transportation, and the facilities to do as well as might be the case. They have potential and demonstrated success as entrepreneurs, but may lack the institutional support and access to information about financial resources and practices that could help them reduce risk and do well. More attention must be directed towards women's credit-worthy ideas which are also environmentally friendly. A related paper from the People's Republic of China at this Workshop discusses women's innovations in enterprise development.

4.1.6. Taking the long-term view for poverty alleviation

66. When rural women's roles as producers, innovators and income-earners are promoted, this may also contribute to protecting the environment over the longer run through reductions in fertility and thus in population growth.

67. Women's health and education influence their own well-being and productiveness. In addition, women's health is clearly related to their fertility and affected by it in turn. Education influences women's status, which is associated with different fertility rates.

68. This brings us to the issue of population and the environment, an inescapably important although controversial subject, that has a major influence on the likelihood or the difficulty or alleviating poverty.

4.2. Population and the Environment

69. UNFPA, is its publication "Meeting the Population Challenge", has emphasized that "Population issues do not command headlines in the same way as ozone holes and the greenhouse effect, but they are just as important and must be given equal priority by citizens, governments and international organizations."

70. According to UNFPA, the 1990's are the "critical decade" - ten years for the global community to confront the challenges of population growth and distribution, resource use and environmental deterioration on a broad scale." By the year 2001, it is expected that there will be 6.25 billion people in the world compared to the almost 5.4 billion now. Obviously pressure on natural resources will increase.

71. In 1987, The United Nations General Assembly called for more attention to the links among population levels, consumption patterns, poverty and the natural resource base. This was in response to the World Commission on Environment and Development, held the same year, which urged the development community to work towards a sustainable future.

72. Population growth brings increasing pressure to bear on limited resources as do high rates of consumption. Although millions of dollars have been spent on development, they have not ended poverty. This is unfortunate for human beings and for the earth itself. The needs of the poor put direct pressure on the environment because many of the resources which they use are natural rather than commercial. On the other hand, people in the industrialized world consume the earth's resources at higher rates than do those in the developing world, albeit primarily in manufactured products rather than in natural form. But manufacturing is likely to increase environmental damage, through a kind of "negative value added."

4.2.1. Perspectives from two worlds: population growth vs "mega-consumption"

73. Because ninety-six percent of the population growth rate is in the developing world, with the highest rates in the poorest areas, it is natural that many look to the governments

involved to contribute to the human future through support for population policies that make family planning services and maternal/child care widely available. It is estimated that their doing so could reduce birth rates by as much as 27 percent in Africa, 33 per cent in Asia and 35 percent in Latin America, with the result that there would be about 1 billion fewer people born. Most of the reductions would occur in areas where resources are already severely strained.

74. When one considers evidence about some specific ways in which population growth affects the environment, the potential impact of such reductions is more evident. For example, UNFPA indicates that population growth may be responsible for: almost two-thirds of the increase in carbon dioxide emissions; up to 80 per cent of recent deforestation in the tropics; over-cropping and land fragmentation which contribute to food production short-falls in so many developing countries; the likelihood that in 10-15 years water consumption in sub-Saharan Africa, the Middle East and parts of Asia, will reach 30-100 per cent of available reserves; and growing pressures on coastal resources, including mangrove forests and coral reefs - of which more than half may already be damaged.

75. Others dismiss the call for smaller families as unnecessary, and point to the high rates of consumption and waste in the developed countries as the place to start improving the balance between natural resources and human needs.

76. UNFPA points out the following details of a generally recognized trend towards what appears to this writer as "mega-consumption" by the North: "With barely 25 per cent of the world's population, developed countries consume 75 per cent of all energy used, 79 per cent of all commercial fuels, 85 per cent of all wood products, and 72 per cent of all steel production." Where mega-consumption rates are supplied by technology which is not environmentally friendly, negative impacts are heightened.

77. Obviously, changes in both population growth rates and consumption patterns can help to ensure that future generations have adequate natural resources. Changes in technology, its distribution and management, are also vital.

4.2.2. Local participation and interests

78. As population grows, natural resources dwindle and poverty deepens; yet the poor could be informed participants in efforts to manage natural resources more wisely while still meeting human needs. The place to start appears to be the grass-root level, where the genuine interests of the poor can best be discovered.

79. Take the case of family size: according to UNFPA, " . . . studies indicate that some 300 million couples, mostly in the developing world, who want to plan their families, cannot do so because they lack access to maternal and child health care and family planning services."

4.2.3. Women's viewpoints, status and fertility

80. Many women, however, depend on large families for pleasure and status, security and labour. The incremental costs of feeding extra children, particularly when meagre diets are standard, may be less than what those children can "earn" in terms of in-kind goods and services, cash, a combination of both, or in terms of substituting for their mothers' labour. In many cases, children are their mothers' main or only technology. A recent FAO (1991) paper,"Towards Gender-Responsive Harmonization of Human and Natural Resources in Agricultural and Rural Development in Subsaharan Africa," presented at the UNFPA-funded Regional Workshop on Women, Population and Sustainable Agricultural Development in Kariba, Zimbabwe, discusses children as a "technological solution" for women in many developing countries where appropriate technology for women's productive tasks is severely limited.

4.2.4. Some practical development assistance examples

81. There is a well known relationship between women's status and fertility. In her book, Rural Women at Work, Strategies for Development in South Asia, Ruth Dixon explored the possibility that effective action programmes could be designed accordingly, to provide young women with income-earning opportunities which might lead to delayed marriage age and reduced fertility. More recent research by the World Bank, UNDP and FAO examines the likely effect which bringing credit, technology and extension to rural women will have on fertility-related behaviour.

82. It appears that income-earning projects, credit programmes, and efforts to develop and disseminate appropriate technology for women, may lead to less environmental degradation if they are associated with increases in women's status and efficiency, which can help off-set desires for large families. DESD, in its paper on women and population as a factor in environmentally sound and sustainable development, discuss more fully the links between women's roles, population questions and environmental issues.

4.3. Protecting the Atmosphere

83. "We are certain of the following: emissions resulting from human activities are substantially increasing the atmospheric concentration of the greenhouse gases."1/ "Greenhouse gases"2/ are so named because they form a layer around the earth that serves somewhat like a greenhouse keeping infrared heat inside and raising the temperature. They are a natural phenomenon without which the earth would have a likely average temperature of -3 degrees F and would be uninhabitable. However, since the Industrial Revolution, human activities based on fossil fuels and some synthetic chemicals have increased the concentration of these gases around the earth to the point that major climate changes and disastrous consequences for all earth's people have been predicted.

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84. Industrialization and urbanization based on fossil fuels and synthetic chemicals are the major contributors of excessive greenhouse gases. Although in principle, governments and corporations can effect needed changes in emissions, vested interests, public demand or even unexamined practices can keep them from doing so as quickly as may be necessary. When informed about greenhouse gases and their potential harm, individuals can, to a degree, influence the extent of the "greenhouse effect" by their own approach to energy use at the household level, by changing their consumption patterns and by strengthening their willingness to try new ways to meet their needs. In groups and as political activists they can also try to influence companies and governments, to achieve greater energy efficiency and conservation from both supply and demand standpoints.

4.3.1. Links with women's activities in developing countries?

85. What does this have to do with women in developing countries? Aerosols, refrigerators, and foams, the primary sources of chloroflurocarbons so much in the Western news because they destroy the ozone layer, are scarcely daily items for the rural poor. The major contributor to warming appears to be carbon dioxide (around 49%), followed by methane (18%), and then by choroflurocarbons (14%), nitrous oxide (some 6%), and other gases such as tropospheric ozone, carbon monoxide, and oxides of nitrogen. The main sources of carbon dioxide emission, which is of primary concern here, are fossil fuels and deforestation. These are also among or the only sources of all the other greenhouse gases except methane and the choroflurocarbons.

86. It has been rightly argued that those in the developed world should change their consumer-oriented life style, which accounts for a disproportionate and unsustainable use of the world's resources, including its non-renewable energy sources. At the same time, in the context of development work, there is room to enable the poor to have access to resources they need, and to do so in ways that can protect the environment wherever possible. This brings us to the linkages between women, the environment and sustainable development so far as new and renewable sources of energy are concerned.

4.3.2. Making choices: women as local managers of natural resources and family welfare

87. It is a commonplace in most developing countries that women are traditionally responsible for providing fuelwood for domestic purposes. At the same time, more and more forests are being cut for commercial purposes without management plans that take into account local needs. The harvesting of timber also occurs illegally. The rich may condone this although the poor are the ones most often blamed. The desire for cash and higher living

standards contribute to increasing demand, as do urbanization and population growth. *Still*, there are cases where local people, whose welfare depends on forests, don't want them to be logged, legally or illegally.

88. Under these difficult circumstances, women have many choices. For example, they can spend more and more time collecting fuelwood but sacrifice other activities and/or their health. They can substitute more accessible species for preferred but harder to get ones. They can change the family diet so that less cooking time, and thus less fuelwood, is required. They can develop or adopt new stoves that save fuelwood. They can try to earn income that will let them purchase rather than gather fuelwood. They can become activists, as they did in the now famous Chipko movement; they can turn to alternative sources of energy. They can become partners in the management of scarce resources. It is regrettable that there has been relatively little opportunity in the development assistance process for women at local levels to be consulted as managers of scarce resources, or even to be considered as interested parties.

A priority for UNCED follow-up

89. In the follow-up to UNCED, women's participation as managers of the environment is a priority that many development organisations consider promising. For this to happen, and with specific reference to new and renewable energy resources, women's related interests, activities and knowledge must first be recognized by policy makers and planners. The new awareness and information should then serve as the basis for alternative approaches and technologies.

90. Projects related to this goal could, therefore, address improvement of the data base on women and the environment with regard to new and renewable energy; training of policy makers on this topic and its implications for a given country or group of countries; and the introduction, adaptation or dissemination of technologies that use alternative energy sources such as wind, sun or biomass.

91. In some cases, the development of electrification projects might be appropriate. It has been predicted that ..."Electricity from wind, solar thermal and biomass technologies is likely to be cost-competitive in the 1990's: electricity from photovoltaics and liquified fuels from biomass should be so by the turn of the century." Where the introduction of such technologies would not bring an adequate return on investment in the short run, they would be likely to do so over a longer period.

92. Whatever the related project idea, it should be developed in concert with local women, taking into account their experience, needs and knowledge. In fact, such a consultation process is likely to be the best way to identify project ideas that represent links between women, the environment and sustainable development.

93. *Some materials to promote this approach have already been developed and field tested.* In 1990, INSTRAW and ILO/International Centre for Advanced Technical and Vocational Training, with AIDOS, an Italian NGO, completed a modular training package, "Women, New and Renewable Sources of Energy (NRSE)". It aims to promote the integration of women's needs and their participation in energy project planning and implementation, with special attention to the development and use of NRSE. Both development planners and senior officials, and women's organizations and institutions are intended target groups.

94. The Global Assembly for Women and the Environment, held in Miami, Florida in November 1991 said that: "Conservation of energy starts in the household and is often related to tasks women predominantly perform. Success stories show that women have developed new approaches to environmentally sound energy production in rural areas and better conservation of energy everywhere. The objective is to take this experience into account in designing environmentally sound energy policies." The conference recommended that Governments should evaluate energy policies in terms of total energy systems including the micro-systems managed by women in the home, as well as their role as consumers and should take into account their views and preferences."

4.4. Protection of Land and Water

4.4.1. Some major problems

95. Land and water resources have all too often been damaged for short-term gains for the few. Soils have been eroded or depleted, water has been polluted, sometimes by run-off of fertilizers and pesticides applied in agricultural projects and promotions. Where watersheds have not been protected, water sources have decreased, dried up, or been fouled.

96. Women have often found themselves outside the influential circles which determine which natural resources are used for what and by whom, and when. As a result, they may find important resources alienated from them, resources to which they had use rights before development projects became prevalent.

97. They try to eke out their livings by turning to resources of lesser quality, and further away. But they have only so much time, and there are more and more demands on it. Sometimes, they can not afford to participate in new approaches that could actually improve their situation. For instance, where zero-grazing could help prevent soil erosion and promote the growth of fuelwood sources nearby, women may support the idea but lack time to gather the required fodder.

98. As soils become depleted, women may be forced to substitute crops or change cooking methods or frequency. Nutrition and health are likely to decline as a result. The extreme case of drought and desertification has the most devastating results, including famine.

99. As water sources are threatened by pollution and deterioration of watersheds, women must go further and further away, or become involved in the management of threatened water sources, the maintenance of pumps where these are available, and the introduction of new methods to use water so that it is less likely to carry disease, and less likely to be wasted. Where rural women migrate to urban centers, they often find themselves without adequate shelter, water and sanitation, and with few if any services or concerned parties.

4.4.2. Some steps towards improvement

100. The important roles that women have regarding natural resources was too long overlooked. The first major international conference to call attention to women's need for land in their own right, was the World Congress on Agrarian Reform and Rural Development (WCARRD), held in Rome by FAO in 1979. Some governments have taken steps to improve or guarantee women's land-use and title rights, which encourage and enable women to play more active management roles. These are likely to be more environmentally sound than are those employed on land used for cash-cropping.

101. The International Drinking Water Supply and Sanitation Decade (IDWSSD) led to a greater interest in women and water. The guiding principles adopted at the Global Consultation on Safe Water and Sanitation for the 90's, held in New Delhi in 1991, called for *inter alia* more attention to the integration of women in related activities and programmes, the need for training activities and improved management of water resources.

102. The International Conference on Water and the Environment, held 26-31 January 1992 in Dublin, Ireland, also contributed an important result to UNCED in recognizing the central role of women in the provision, management and safeguarding of water, and in affirming that every human being has the right to reasonable access to clean water and sanitation. This was set forth as a principle stipulating that "Women play a central part in the provision, management and safeguarding of water," which was elaborated as follows: "This pivotal role of women as water users and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance of this principle requires positive policies to equip and empower women to participate at all levels in water resources programmes."

103. INSTRAW, in collaboration with ILO/Turin Centre and UNDTCD, have developed a relevant multi-media modular training package, "Women, Water Supply and Sanitation," which can be the basis for training senior officials, development planners, technical specialists, and managers of training institutes in the subject. DESD's paper on women and water-related environmentally sound, sustainable development provides an analytical overview of the current situation of women's role and participation in water-related sustainable development and recommends some methodological approaches and strategies for the systematic integration of women and women's interests in water resources development programmes and projects for sustainable development.

5. Protection of Biodiversity

104. The protection of bio-diversity requires a number of obvious elements: knowledge about existing and threatened plants and animals, particularly endemic ones; the uses and abuses to which they are subject by whom and why; involvement of local communities in their protection and management; alternative plants and animals with desirable characteristics to serve the purpose of the threatened species, and even of the one(s) which become dominate in the eco-system, and which therefore may need to be removed.

105. Indigenous knowledge about endemic and other species is a treasure that is being lost, lessened everyday as habitats are neglected, plundered, or simply used a little bit more. Women have much of the treasure in their hands but tend to be disregarded as potential protectresses or managers, written off as mindless exploiters, blindly driven by poverty to use everything up, almost like human locusts. If women's knowledge were respected, if they were empowered to manage dwindling precious resources, and supported to find alternative and constructive solutions to providing for domestic needs, they could be a formidable force to protect the environment.

106. Women's knowledge, women's voices both professional and local could help identify those plants and their features which are the most important from the female perspective. Inventories of plants, should, therefore, recognize their social as well as their economic purposes and uses, so that assessments of their importance will better incorporate both male and female perspectives.

107. Strong and informed public involvement in protection of bio-diversity is obviously needed. Women have a major role to play, particularly in relation to the plants and animals that are part of their lives, about which men may take little notice. Women's knowledge, women's voices, both professional and local, can help identify those plants and animals and their features which are the most important ones from the female perspective and taking into account women's roles in agriculture. Inventories of plants and animals should, therefore, recognize their social uses so that assessments of their importance will better incorporate both female and male views

6. Technology Transfer

6.1. Whose Benefit? Whose Problem?

108. The transfer of technology from developed to developing countries led to many environmental problems, which the development community is attempting to ease through the introduction of environmental impact assessments, the call for environmental accounting, a shift to more human-centred development, and the programme of Agenda 21. New technologies that are more "environmentally friendly" are clearly needed, ones that can serve local needs over time and which would satisfy a more informed public. Much of the

discussion concerning technology transfer for environmentally sound and sustainable development refers to that involved in production and management by large-scale endeavors in urban centers. Women as well as men should certainly be informed about such technologies and the impact which they could have on their everyday lives.

109. Overburdened poor women are not likely to be concerned, however, unless the problems involved are urgent and clearly communicated in ways that make sense for their lives. Effective networks are needed, which offer some potential for two-way communication, so that women see a possibility to influence government and private industry. In too many cases, there are very weak links, if any, between the parties involved, including international organisations, women's units in government, poor women, and non-governmental organisations.

110. Those concerned organizations aware of specific public interest issues involved in technology transfer in a given developing country or group of countries, face a considerable challenge if they want to put before local women issues that matter and about which local women have a reasonable chance to effect change. While the prospect of wasting poor women's time may discourage activities in this arena, it is not satisfactory to leave them uninformed about potential major impacts which technology may have on their own and their children's lives, whether from industrial wastes, nuclear power, transportation or other sources. For example, accidents at nuclear power plants raise the question of the public's right to be more knowledgeable about the risks in their areas from the introduction of new technologies. If informed and unable to influence decision-makers, they would still have some opportunities to change their own lives in order to reduce risks involved.

111. Most organisations which address women's interests, have so far focused on small-scale appropriate technology rather than on those issues just discussed, from which women's interests have generally been excluded. UNIFEM, for example, set forth the slogan, "If its appropriate for women, its appropriate." which simultaneously conveys the ideas that women's activities call for appropriate technology and that women should be consulted or the innovations may not really be appropriate after all.

112. Concerned that ". . .scientific and technological knowledge is not put to better use in helping poor women with their daily struggle of balancing basic needs and environmental preservation," Marilyn Carr, a specialist on technology with UNIFEM, has suggested that answers to a number of questions about any so-called "appropriate technology" could ensure better results. The questions are: Is it appropriate? Is it sustainable? Is it an improvement? Is it a priority? Is it culturally acceptable? Is it bottom- up? Is it accessible? Is there a will?

6.2 The Data Base and Technology Gaps

113. None of these questions will be asked with regard to women's interest unless and until the centrality of their activities in various aspects of development is recognized. To that end,

a variety of organizations have worked for years to improve the data-base on women's roles in developing countries and to show the links between support for these and the advancement of a variety of development goals, as well as women's situation.

114. Generally speaking, rural women's key roles in, and their knowledge about agriculture, agro-forestry, watershed management, water supply and sanitation are now recognized. There is a growing body of work on their roles in energy conservation, and their existing and potential contributions to management of the environment. Nonetheless, fuel-efficient stoves are probably the main technological innovation that has been introduced for women, and even these were not always developed taking women's own views and needs adequately into account from the beginning.

115. Some other promising technologies to benefit women include the non-conventional renewable energy sources such as solar, wind, mini-hydro and bio-gas. Although solar and wind power are not very common in large-scale projects, they are being introduced in more and more rural areas for very specific purposes, on a kind of trial or demonstration basis. Relatively few of these purposes appear to be related to women's non-stereotypic roles. On the other hand, according to a recent review of appropriate technology by Carr (1991), mini-hydro powered mills introduced in Nepal, have apparently saved 800 to 5,000 net person hours per annum - primarily women's and children's time. Biogas technology is not widespread outside of Asia. More attention is needed on the ways to meet rural communities' energy needs through non-conventional renewable energy sources, and to reduce thereby both the degradation of the environment and the abuse of women's limited time and energy.

116. Genetic manipulation is another area of concern. Again, women's as well as men's interests are important to consider. For example, if potatoes are made more disease-resistant through genetic manipulation, if date palms can be made to bear more quickly once genetic markers for male and female are identified, will men and women benefit differently and in what ways? These are examples of the kinds of important WESD questions one can ask related to on-going genetic research in plant production.

117. The answers to such questions would obviously depend on the responsibilities, activities and knowledge which men and women have regarding various plants, or animals, in different societies. For instance, where women are expected to grow, harvest, sell, or prepare potatoes, genetic manipulation that creates disease-resistance would likely mean more volume and better quality potatoes sooner. This could enable women to save more time or earn more money, benefiting them and their families. Where women tend to be employed packing dates, there would likely be more jobs for them if date production were increased beyond that of the natural cycle.

118. Although a sophisticated field, and one sometimes associated with possible exploitation of the developing world by the more technologically advanced North, bio-technology can become a tool to help solve everyday problems for women as well as men in the South.

Whether it does or not depends on the kind of problems identified for solution, whose problems they are, the degree of sensitivity and care shown about how solutions in one area may lead to disasters within the ecosystem concerned, and the "ownership" vs. free availability of results.

119. Those interested in WESD questions related to bio-technology could consult local women in developing countries about both the problematic and desirable characteristics of the plants which are part of their daily lives, and bring this information to the attention of policy makers and research institutions. For example, inventories of local plants, endemic or not, could include information about "important for what and for whom, " as a crucial first step to safe-guard a genetic diversity that includes plants which women as well as men in the developing world find important for their lives.

120. There are also questions concerning gene banks and ownership of genetic materials. To many the prospect of a gene bank or banks contains yet another threat of commercialization and exploitation of the South by the North. Others see them as a timely way to protect important life forms and the ways of life that involve them. They believe that control and access can be negotiated so that the results will be fair and acceptable to all nations. It can be noted that UNCED has a related committee on this issue and that the 99th Session of the FAO Council, June, 1991 proposed that the Commission of Plant Genetic Resources become the Commission for Biodiversity in Food and Agriculture, which would *inter alia* recognize the importance of animal as well as plant diversity and the relevance of both to nutrition. This broader approach is in keeping with the results of UNCED.

121. Women's groups and representatives have tended to resist and resent the prospect of commercializing what is considered freely given by nature to local people.

122. In light of all of the above considerations on technology, there is a consensus that the demands on women's time are too high, and that projects should not add to their burdens. This concern could, however, be used as an excuse to avoid identification, development and dissemination of technologies which could bring women greater returns from new activities that could be substituted for old ones.

6.3. Technology that Changes Gender Roles: The Need for Consultation and Negotiation

123. In short, a data-base on women's traditional activities need not be used to condemn them to a life without change. The opportunities which new technologies could offer women should always be considered, along with the trade-offs which these may require. Obviously, projects would need to be based on and feature consultation with local women. Projects involving appropriate technology may also need to support negotiations between women and men about activities and benefits for both when gender roles could be changed by the introduction of new technologies. For example, men frequently take over activities from

women once technology has been introduced to make them more efficient. Although this could save women time, it could also cause them to lose control of needed products, income earning possibilities, and status.

7. Financial Resources for Priority Goals

124. Financial resources are of obvious and major importance for follow-up of UNCED, where they were dealt with as a cross-sectoral and priority issue. New funds have been, and no doubt will continue to be established, and new policies can redirect already existing funds. Those who would encourage greater involvement of women and support for their roles in the follow-up to UNCED can benefit from networking and sharing information about relevant funding sources and ways to access them, as well as from orienting policies so that funds will be reallocated to support efforts on behalf of WESD. This section briefly describes a major new fund, The Global Environment Facility. It also calls for networking to share information on less visible funds.

7.1. The Global Environment Facility (GEF)

125. The GEF is a fund to support "international environmental management and the transfer of environmentally benign technologies." It was announced in Paris in November 1990, following the commitment of both industrialized and developing countries to a co-operative venture with the World Bank, UNDP and UNEP, which divide administrative responsibilities.

126. Its main goals are: reducing and limiting emission of greenhouse gases; preserving biological diversity and maintaining natural habitats; arresting the pollution of international waters; and protecting the ozone layer from further depletion. The initial budget showed 70 -90% of intended expenditures were for reducing and limiting emission of greenhouse gases and preserving biological diversity and maintaining natural habitats. It is expected that additional goals may be added over time.

127. The World Bank administers the funds (held in a trust fund). UNDP is responsible for pre-investment and technical assistance activities. The World Bank is responsible for investment operations.

128. Projects must fall in one of four major areas: reduction/limitation of greenhouse gases; protection of biological diversity; protection of international waters; and protection of ozone layer.

129. The criteria for project approval are that: GEF funds are additional to regular assistance; the project must relate to one of four specific areas; the project would otherwise not be funded or viable without GEF financing; only nations signing the Montreal Protocol are eligible for GEF ozone protection funds; UNDP, IBRD and UNEP review each proposal for GEF financing; the project should contribute to an understanding of global environmental

problems; Gross Domestic Product of the recipient country must be at or below $4000 per capita as of 1989; GEF funds should complement but not substitute for other types of funding; cost sharing is acceptable; projects must be consistent with global environment conventions; projects will be evaluated on their likely physical effectiveness and benefits rather than monetary benefits; a project to be feasible must result in sustainable long term benefits; the project should promote institutional capacity building, appropriate technology and local community involvement; and projects should increase the leverage of GEF funds by mobilizing other types of funds. Technical assistance projects for GEF financing must be submitted through the local UNDP office to the appropriate UNDP Regional Bureau in the same way as other UNDP projects.

130. Those interested in utilizing new funds for projects in support of women, the environment and sustainable development would do well to think through and develop projects with linkages related to the priority goals of GEF, either to strengthen existing projects or to initiate new ones. Since the great majority of funds is intended to reduce greenhouse emissions and to protect bio-diversity, discussions were included in earlier sections on linkages between these goals and women's concerns.

7.2. Some Complementary Funding Possibilities

131. UNDP also offers Special Programme Resources (SPR), some of which are already committed to women and the environment concerns, and TSS-1 funds, to support development of new programming approaches, which can benefit the environment. Efforts can be made to draw on these sources even more fully than at present for WESD projects.

132. In order to know what funding sources are available and how to access them, women need networks to help them. The NGO community has, in the past, provided guides to funding for projects of interest to women. The International Women's Tribune Centre's "Proposal Writing and Financial/Technical Assistance," is a useful example. One about funding and guidelines for WESD projects would be timely. Wide dissemination to national as well as international NGO's could help put Agenda 21 into practice.

133. Local communities also play an active role in follow-up by bringing local concerns to the attention of governments, and calling for restructured national budgets in light of new priorities. Social services in many countries have been sacrificed for the sake of military expenditures, which are under scrutiny in many countries, given rapidly changing international circumstances. Negative impacts on the environment, and on human beings because of these, can be alleviated in some cases through restructuring the budget.

8. Policies for Managing the Environment over the Generations

134. Political will, a global viewpoint, structural changes in institutions, new management systems, a greater concern with WESD and more involvement of women professionals, research and data related to WESD, training of policy makers in light of all the above, and

new methodologies in development planning and delivery, are among the elements that are clearly needed to control and improve the development process with regard to environmental issues and vulnerable groups, including women.

135. Political will is needed if there are to be new policies that will lead to: (1) better management of the environment over the generations; (2) adequate livelihoods and quality of life for people in developing as well as developed countries; and (3) respect and support for women's contributions in the process. This will is not likely unless national governments are aware of, and concerned about the problems involved, and see connections among their own, global and inter-generational interests. On the contrary, developing countries have tended to take the position that for too long, the North has had too much control of and benefit from the development process, and the South, far too little. UNCED sought a balance between the interests of North and South, and a bridge across any related differences which could otherwise obstruct a new and more global policy on the environment, with enlightened and full participation by developed and developing countries.

136. It is evident that today's managers of development processes face increasingly complex tasks because the new problems require new concepts, new data, interdisciplinarity and consultation, all in an arena where coordination mechanisms tend to be inadequate given both the complexity and competition involved. The manager's standard question, "What resources, what benefits, and for whom?" is central to the development community's themes and approaches in the '80's and the '90's, but with even more difficult questions added: "How to make the results equitable for vulnerable groups--the poor, women, children ?" and "How best to take their views and experiences into account?" Where non-renewable natural resources are concerned, it is urgent that consideration be given to the future generations, which are perhaps the most vulnerable groups of all. This would guarantee that natural resources are not exhausted, and that both flexibility and consultative processes are established in development institutions, so that they can respond adequately to future needs.

137. Where the management of scarce resources is concerned, women have always played an important role. For centuries, although men tended to be the hunters and "politicians", women were expected to provide daily food and other items for their families, using what was available in nature. This was part of their domestic role, and it remained their responsibility year after year. If they were to succeed, they could not deplete the resource base, nor could they be unfamiliar with the characteristics of plants and small animals involved. Women are sometimes credited with the invention of agriculture, perhaps in response to their need for a stable resource base that could be managed efficiently on a daily, predictable basis. Activities that today are usually treated as "productive " rather than "domestic" very likely had a domestic impetus and aspect from the beginning.

138. It is particularly fitting then, that Agenda 21 calls for more participation of women in the management of environmental resources. Project ideas in this and other papers at this meeting will feature ways to bring women's concerns, knowledge and voices to bear on environmental issues.

139. Resolutions and recommendations emanating from international conferences do not always lead to action that involves and benefits the poor directly. This is likely to be even more true in the case of women because planners tend to ignore their important roles in development and their potential contributions to its management. To achieve more relevant and effective results from UNCED, it is urgent that any formulation or reformulation of environmental policy or programmes take women's vital domestic and productive roles into account. Co-operation between local women, NGO's, Women's Bureaus and Central Planning and Sectoral Ministries as well as the business community has been identified by many organisations as an important but under utilised means to facilitate the inclusion of so-called "women's concerns" into the mainstream of development. It appears to be especially appropriate here because the success of efforts to improve the environment will depend on broad participation.

8.1. Research, Science, Administration

140. As new points of view are included in research and as new methodologies develop, knowledge changes, revealing over time more and more of the truth. This is why it is so important to include data about women's experience and views in any research about development, the environment and human needs. Although the centrality of women's roles has been recognized in Brazil by the UNCED, the details are just beginning to emerge to show the links which these roles have with the state of the environment and the prospect for sustainable development. Many of the examples available now come from anecdotal rather than systematic or quantitative enquiry. There is therefore a need for more solid and far-reaching research on the host of specific subjects involved, for each of the themes addressed here as well as for others discussed in Brazil. New statistics, or desegregation of existing statistics by gender will be important in the research effort.

141. So far we have talked primarily about involving women from local communities in management of the environment. There is also a need and an opportunity to identify and involve women professionals, including scientists, who have training and skills in various fields related to the environment. This idea is pursued, for example, in some of the papers being presented at this seminar by the People's Republic of China, and in the DESD paper on administration. Building a roster of talented women from around the world could be an important contribution to advancement of WESD.

8.2. Training and Guidelines/Checklists

142. The success of human-centered development will thus depend on thoughtful management of natural as well as human and financial resources in a consultative process with the standard of sustainable development in mind. This is more than most managers have been trained to consider. There is a real need for training programmes, packages and guidelines to be developed, based on Agenda 21, related to both priority cross-cutting and substantive issues. For example, each of the major topics treated above could be featured in guidelines that showed the links with WESD and Agenda 21 recommendations or resolutions.

Packages such as those developed by INSTRAW, ILO/Turin Centre and UNDESD on Women, Water Supply and Sanitation, and Women and New Renewable Sources of Energy, contain useful material and approaches. Existing guidelines, particularly those about women and forestry from FAO, FINNIDA, the Netherlands and the World Bank, can be adapted in light of Agenda 21. They can also be used as models for the development of guidelines concerning women and development related to other topics, such as protecting the atmosphere, technology transfer, bio-diversity and bio-technology.

143. One of the first follow-up meetings to the 1985 World Conference to Review and Appraise the Achievements of the United Nations Decade for Women, held in Nairobi, Kenya, was the FAO and INSTRAW sponsored meeting in Helsinki, Finland, (Evaluating Bilateral and Multilateral Experiences on the Development and Use of Women in Development Guidelines/Checklists: Implications for National Use in Formulating Agricultural Projects for Women), stressed the importance of joint efforts by, and consultation among various interested groups in the process of turning the results of an international conference into concrete action programmes at national and local levels. For example, Women's Bureaus, NGOs and community representatives could sit with Ministry officials to review together ideas for how to incorporate and operationalize recommendations from Nairobi into existing policies and plans, and to develop ways to broaden these if necessary. This same approach would be relevant and timely in the follow-up to UNCED.

144. The practicality of this kind of approach was demonstrated even before UNCED. For example, in 1991, in Nepal, Pakistan and Bangladesh, UNIFEM sponsored National Peasant Women's Summits ". . . to enable women at the grassroots level to share their experiences and articulate their priorities on the management of natural resources with policy makers, planners and environment experts."

145. In recent years, extensive training programmes in Women-in-Development and gender issues have been produced and organized for staff training by a number of international development organisations, including UNDP, the World Bank, FAO, CIDA, DANIDA, FINNIDA, and SIDA. They can be used to incorporate more attention to environmental issues as called for by Agenda 21.

146. It is worth noting that the FINNIDA programme focused on project preparation in a variety of sectors, and required participants to reflect both environmental and women-in-development issues through the use of an Environmental Impact Assessment (EIA) and a Rapid Gender Analysis system that focused attention on women's relevant knowledge, activities, responsibilities and incentives (see Annex). It is one of the few, if not the only, training programme that combining environmental and gender issues in a format which leads to project design. FINNIDA has also used it in developing countries with national, field and embassy staff participating in sessions that reveal and resolve many differences among participants according to their background and gender. Key elements featured in the process of project design are discussed further below.

8.3. Technical Co-operation among Developing Countries and in the United Nations System

147. The need for an exchange of successful experiences in WESD efforts, among developing countries and UN agencies, along with the establishment of better communication and coordination mechanisms, is clear. This is true for every subject discussed so far. The balance between human needs and environment over time is of inescapable importance, and women's role is fast becoming a central issue.

148. The actual importance of women's knowledge about the environment and their participation in its management may still be under-estimated despite increased discussion of both, most recently at Agenda 21. In fact, only if development work incorporates a more caring approach to the earth, and its vulnerable populations, can the human future be envisioned.

ANNEX I

Operational Guidelines for WESD Project Ideas for Possible UN System Technical Cooperation in the Follow-up to UNCED

Introduction

Sections I through III of this annex present project ideas grouped according to the level at which they would be implemented -- policy, institutional, or community. Project ideas from different levels can be combined for synergistic effect, an approach that is outlined very briefly in section IV below. All projects are meant for consideration for inter-country and inter-agency implementation, not only the one country, one donor, one technical agency approach.

As the title indicates, this Annex can be used as an "Operational Guideline for Follow-up to UNCED on WESD, for UN System Technical Co-operation." Project ideas that are most interesting to participants, would of course need to be developed more fully according to the format and requirements of the donor(s) concerned.

I. To Build Awareness of WESD Linkages with Policy Issues and to Increase Support for These at the Policy Level

I.1. "Translate" Agenda 21 Priorities for WESD into a Policy Level Programme

Activities: a) select priorities from Agenda 21 for WESD follow-up, (see above paper and other sources); b) conduct research about the ways in which different types of economies in different regions would be affected by implementing these Agenda 21 priorities, or by not doing so; c.) consult with rural women (see I.3, below); d) construct models as to how general changes and/or changes in specific fields for selected objectives would affect women and be affected by them, given their knowledge, activities, responsiblities and incentives related to environmental issues; e) assess the present state of women's access to needed natural resources, to inputs and services; f) assess the costs and benefits of improving these with regard to various development goals; g) develop new programme and budgetary priorities accordingly; h) introduce staff training and identify possible rewards for changes in professional conduct that follow it.

I.2. Improve Data Base and Statistics Related to WESD and Agenda 21

Activities: a) collect data; b) disaggregate existing data and c) analyze both by gender with regard to linkages between women's knowledge, activities, responsibilities, incentives and environmental sectors and priority topics; in light of Agenda 21, the linkages should include those for bio-diversity and bio-technology, as well as protection of the atmosphere (with potential GEF funding in mind), in addition to linkages with topics considered more often with regard to WESD, such as alleviation of poverty, technology transfer, protection of land and freshwater resources; d) prepare case studies on regional basis, and for inter-regional TCDC presentation and discussion.

I.3. Consult with Rural Women Community / Knowledge Leaders and Their Advocates

Activities: Meetings between policy makers, rural women and their advocates, such as those sponsored by UNIFEM and FAO, but on a broader spectrum of issues, taking the Earth Summit agenda and results into account, could identify, discuss and call for specific actions regarding a) those topics from the Earth Summit which are of primary interest to local communities, particularly women; b) women's own ideas for follow-up; c) those aspects of Ministry plans and objectives which are related or could be adjusted; d) additional resources potentially available in light of international concerns as demonstrated by the Earth Summit, community interests, the participatory approach, and new networking possibilities; e) follow-up on a TCDC basis, to review and exchange success stories.

Preparatory activities could include, in addition to the ideas in I.1 and I.2. above, a) preparation of summaries of the Earth Summit concerns and results related to WESD, for presentation in a variety of ways to rural women in local communities (see Communication of Earth Summit Results under Empowering Women in Local Communities); b) identification of women community and "knowledge leaders" (local experts on particular topics and natural resources), for participation in the meetings; c) advance consultations with these and other local women regarding their priorities; d) review of line Ministry programmes for relevant items, both present and potential, and ways in which these might be adjusted in light of Earth Summit results and government priorities related to WESD; e) identification of local, regional and international NGO and other organizations interested in this topic; d) networking to identify new funding sources among them.

I.4. Develop Guidelines/Checklists for Use Regarding WESD Linkages and Support

Activities: a) review of existing guidelines/checklists for topics as above; b) identification of gaps, with particular attention to bio-diversity/ bio-technology, and protection of the atmosphere;
c) consultation between specialists in those fields and with WID experts, NGO's and rural women to develop needed guidelines/checklists; d) adaptation of the RGA/KARI format for particular subjects.

I.5. Review and Modification of Existing Laws and Enactment of New Laws to Support WESD Concerns

Activities: a) identification of existing laws and practices which impact on the environment, and which in turn have negative effects on women given WESD linkages; b) proposals for changes, with cost/benefit analyses to include both social and economic aspects; c) organization of advocacy needed throughout the process of change; d) follow-up through the mass media, local meetings and innovative techniques to inform women about any changes and their rights.

I.6. Prepare and Disseminate WESD Policy/ Planning Packages

Activities: Development and dissemination of information and training packages (such as those available from INSTRAW, DESD and ILO/Turin on NRSE and Water and Sanitation) on various environmental topics and women's concerns, would incorporate results of other "sub-projects" in this section, including:

- arguments as to why support for WESD is a pre-condition for the attainment of specific development goals and objectives - data about women's knowledge, activities, responsibilities and incentives vis a vis the environment in different types of economies, with regional differences high-lighted if possible;

- sample speeches in support of WESD, and relating it -- in light of data from the above--to the attainment of priority development goals, such as alleviation of poverty, balance between human needs and natural resources, reduction of the debt burden, improvement of the environment, as well as to specific subjects like bio-diversity, etc.;

- information on the ways in which existing laws affect women negatively and positively regarding the environment, together with proposals for changes, and the likely costs and benefits;

- success stories, based on TCDC exchanges as anticipated above, and/ or on NGO meetings such as preceeded the Earth Summit.

I.7. Workshops to Train Policy Makers on Why and How to Support All the Above and Use the Results Effectively (to feature the packages from I.6)

II. Towards Institutional Strengthening

II.1. Through Advancement of Women in Research and Management Regarding Environmental Concerns and Links with WESD

Activities. a) select institution(s) and sector(s) for initial concerted efforts towards advancement of professional women with backgrounds or interests related to WESD; b) support formulation (with assistance of a consultant) of a management plan for staff development to fulfill selected Agenda 21 and WESD priorities, and include a quota for women's participation in (i) short term management or skill training, (ii) longer term professional development; (iii) the over-all staff picture, for short term and long term employment;
c) identify women for career development who are already working in the institution(s) and sector(s); d) build a roster, through regional and inter-regional multi-disciplinary co-operation, of women professionals, as candidates for employment, who represent various disciplines, such as plant production, climatology, irrigation and soil science, in which there are relatively few women; e) survey courses and programmes available for related short and long term staff training; f) develop and offer courses as needed to fill the gaps
g) accompany this project with staff-training for top-management and others on gains for them regarding WESD as a pre-condition for reaching development goals, etc.

II.2. Develop Monitoring and Evaluation Systems for Follow-up on WESD/Agenda 21

Activities: a) on a pilot basis in co-operation with governmental bodies, non-governmental organizations, or private sector ones, develop and test coding systems for the extent to which activities which impact on the environment have negative/positive effects on women, and vice versa, with respect to priority themes and subjects; b) train staff to apply system at regular intervals to monitor any changes in light of goals from I above; c) evaluate at end of one, two and three years (or another suitable schedule); d) recommend changes in programme to enhance identifiable positive results and decrease likelihood of negative ones.

II.3. Build or Strengthen Inter-Sectoral and Inter-Disciplinary Mechanism for WESD

Activities: a) for existing inter-sectoral committees of a given institution or group of institutions, support sessions to review activities in light of WESD and Agenda 21, and ways to strengthen or eliminate them accordingly; b) within existing financial and human resources, create any new inter-sectoral committees needed, to brainstorm on ways to implement new priorities from Agenda 21 and to assign complementary responsibilities for follow-up; c) plan re-allocation of existing resources accordingly.

II.4. Strengthen Research on WESD

Activities: a) see I. 1 above; b) see II.1 above; c) provide or secure funds for research projects from II.1.(c) and (d) above, on WESD related to priority topics such as bio-diversity, bio-technology, protecting the atmosphere, etc. ; e) organize related multi-disciplinary meetings for discussion and planning purposes, to select topics of joint interest, create research teams, and identify additional resources if needed.

II.5. Improve and Design WESD Related Courses and Curriculum

Activities. a) identify interested educational institutions at different levels; b) review existing course and curriculum content in fields related to Agenda 21 priorities for ways in which WESD issues, information can be highlighted or introduced; c) support adaptation of courses, curriculums by with local expertise as available; d) develop new materials as needed in prority subjects, drawing on data, guidelines etc. as available from any relevant projects at the Policy level;

for college level courses and curriculums in various fields such as rural development, forestry or agro-forestry, plant production, biology, population, economics, home economics, etc., a) identify interested institutions in both regional and inter-regional frameworks; b) conduct reviews of content for gaps in light of WESD and Agenda 21, as above; c) hold multi-disciplinary meetings to recommend curriculum changes; d) introduce on trial basis in a network of co-operating institutions; e) follow-up with assessment meetings, on both regional and inter-regional levels.

III. Towards Employment of Women in Local Communities

III.1. Communicate Results of Earth Summit to Rural Women through Traditional Forms and Talents

Activities. a) select results of potential relevance to rural women, in consultation with their representatives, NGO's and women's bureaus, etc.; b) determine the most culturally appropriate means to communicate results to women, whether in song, skits, dance, puppet plays, slogans on fabric, fashion, etc. in addition to mass media; c) identify, select and employ local writers, singers, dancers, designers etc. to produce the traditional forms to be used; d) liase with local women's groups and organizations to organize presentations and their follow-up; e) stage presentations in ways, places and times most convenient for rural women in light of their work-load; hold follow up meetings with women regarding their views, ideas and interest about activities on their behalf and to better manage scarce resources over time; f) specify incentives, risks and trade-offs.

III.2 Build Support Systems for Women "Knowledge Leaders" and Innovators at Grassroot Level

Activities: a) identify women "knowledge leaders" at community level--those reputed to be guardians of traditional knowledge on a variety of subjects which relate to the environment, such as plant propagation, biological insect control, small animal health, plants for medicinal use, soil and water quality and conservation, etc.; b) meet with them to record their knowledge (if they are willing), and to identify questions, suggestions and concerns they may have about changing environmental circumstances; c) include them whenever possible in meetings with policy makers, see I. above, and with representatives of institutions and organizations which could help address their concerns; d) summarize their knowledge, activities, questions and concerns in a format for wide dissemination, such as film strips, videos or movies; e) use as the basis for women's "traditional knowledge" exchanges and to improve communication about their capacities and contributions with government and others who control needed resources and services.

III.3 Develop Local WESD Participatory Management Programmes

Activities: a) in light of III.2 above, identify core problems and knowledge leaders for potential WESD participatory management programmes; b) develop these in consultation with government and community representatives with regard to threatened natural resources, the use of which might be banned altogether if local communities are not active and responsible in management; c) plan together monitoring methods and consequences for any abuse, which will involve community and government commitments rather than government "policing" alone; d) as appropriate, involve women knowledge leaders, see III.2, in responsible and respected roles; e) prepare case studies for TCDC exchange as basis for further projects and publications related to this over-due approach of central importance to Earth Summit follow-up.

III.4 Hold Meetings with Policy Makers

Activities: see I.3 above, and include results from III.1, III.2; and III.3 as available.

III.5. Focus Research on WESD Subjects of Particular Importance at Local Levels: 1. Management of Small Land-Holdings; 2. Protection of Traditional Plants, Animals and Their Uses; 3. Women's Role in Watershed Management, etc.

Activities: a) Identify priority topics based on literature review in light of knowledge about WESD and Agenda 2, as well as consultation with interested national institutions and organizations and with local women knowledge leaders, innovators and others; b) organize planning seminars; identify researchers and institutions to be involved; c) publish and disseminate results in ways that will reach women's groups, local communities, extension programmes.

III.6 Develop Specific Projects on Substantive Topics Below

Activities: those that will increase women's access to natural resources on a sustainable basis; the needed inputs, services, technology and information for production; and to those that will increase women's status, through the above, plus income-earning opportunities and entrepreneurship; see below by topic for specific examples, and expand the list through consideration of local circumstances and with local consultations.

IV. Synergistic Approaches

Activities: a) determine the combination of projects that will be the most effective, involving all three levels above, when identifying any individual project idea as a priority; b) plan the means and sequence to address all three levels for greatest effect, with inputs from one strengthening action at the others; c) identify those funding and technical agencies within the UN system whose resources and expertise are most relevant, and the inter-agency co-ordination mechanisms existant or needed to support co-operation; d) identify those NGO's experienced and interested in the technical subjects and methodologies involved; e) programme relevant planning meetings, and follow-up, including accountability for all concerned.

Notes

1/ DESD's review has indicated a need for: the coordination of the UN system and bilateral donors to implement the sections of Agenda 21; the substantive implementation of sections of Agenda 21; the provision of policy-oriented studies for the Commission on Sustainable Development; the participation/coordination with GEF and other multilateral financial programmes; the development of education programmes with the international media; the coordination and management of NGO participation in the implementation of Agenda 21; and the development and supervision of UN development and environment standards and practice.

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WOMEN, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT
(Agenda item 7(a) of the Provisional Agenda)

United Nations International Research and Training
Institute for the Advancement of Women (INSTRAW)

1. Introduction

The connection between women, the environment and sustainable development gained attention when it became apparent that the twin crisis in development and ecology were closely linked. The chemical and radio-active contamination of soils, air and water, the decreasing biodiversity, the alarming rate of the depletion of resources and deforestation pose not only local but global problems which increasingly jeopardize the very survival of humankind.

The growing recognition of the relationship between the crisis in development, deepening global ecological problems, the increase in poverty and population, and gender inequalities, signalled the need for more comprehensive approaches to sustainable development that include sociological and ecological concerns.

The topic of Women, Environment and Sustainable Development encompasses inter-alia, such varied areas as agriculture, water, energy and forestry. Moreover, it includes all aspects of women and the environment within the context of economic development as well as the effects that the global environment has upon their lives. Because of this complexity, today we are still in the process of transforming Women, Environment and Sustainable Development from a general concept into pragmatic actions at the local, national, regional and international levels.

The topic of Women, Environment and Sustainable Development is increasingly accepted as an agenda item for discussion at international development and environment fora. It allows for the examination of the crises in development and environment to be examined more holistically. Moreover, this different approach has the potential to transform the practice of development.

During the 1950s and 1960s, the concept of development was defined mostly in gross economic terms and conceptualized according to growth models adopted from the major industrialized countries. Women were seen only as beneficiaries of development. This approach failed to improve the living conditions of a large proportion of the developing world's population. As a consequence, distribution and basic needs became the focus of attention in promoting development. Scholars with a sensitivity to women's issues had noted already that women were not sharing in the development taking place and in fact they were often jeopardized by it. (Boserup, 1970). The "basic needs" approach emphasized the role women play in catering to health, sanitation and other needs of the family but overlooked the fact that for a real change to occur, women must be considered not only as beneficiaries but also as agents of developmental change. Growing concern about women's role in the development process and the need for adequately accounting for their contribution led to the organization of the first UN Conference on Women and Development in 1975 in Mexico City and the declaration of the Women's Decade from 1976 to 1985. The major outcome of the decade was the formulation of the Nairobi Forward-Looking Strategies (NFLS), a 372 paragraph document, adopted at the 1985 Conference held in Nairobi to mark the end of the Decade. The NFLS outline the measures needed to meet the demand for equality between the sexes and to ensure the full integration of women into the mainstream of socio-economic development.

Once the importance of women's dual role as beneficiaries and contributors to development was acknowledged, many institutions both governmental and nongovernmental, international and national committed themselves de jure and/or de facto to adapt their policies accordingly. These efforts still continue.

The linkage between women, the environment and sustainable development (WED) is now increasingly acknowledged and understood. More and more women are perceived as a vital part of the solution to the crisis as "environmental managers". The fact that women have many of the specific skills and possess the knowledge that is essential to the care of the environment is being recognized. As users and managers of natural resources, women constitute the majority of the farmers in developing countries. They are also the main gatherers of food, fuel, water, fodder, medical plants and raw materials. They have gained, through practical experience, a vast knowledge of the various types of plants, kinds of fuelwood, types of soils and agricultural practices necessary not only for survival but also for the well-being of their families and communities.

However, current development planning and projects do not always take into consideration the holistic nature of human activity and thus ignore women's experience and knowledge. Often development practices have had unexpected side effects due to the lack of consultation and participation at the local level, especially women. An important contemporary issue is to ensure that policy makers and planners recognize the medium and long-term economic benefits of including women in the solution of environmental problems. In fact, difficulties in adopting strategies to minimize negative environmental impacts are expected to continue until women, environment and sustainable development are seen and taken as the indispensable foundation for long-term economic and social growth.

2. Alternative Approaches to Sustainable Development

The last thirty years has been a period of growing awareness of both the ecological limits to economic growth and of the precariousness of ecosystems giving rise to a process of environmental reforms in political and economic institutions. The influence of these reforms is evidenced by the adoption of an environmental agenda at national and global levels. Today, there are few countries which do not have an institutional and legal framework for the protection, regulation and/or the use of natural resources though their scope and effectiveness may vary. Since the United Nations Conference on Human Environment which took place in Stockholm in 1972, and the subsequent establishment of the United Nations Environment Programme (UNEP), the prominence of environmental issues on the international and, in particular, on the UN agenda has been growing. The United Nations Conference on Environment and Development (Brazil, June 1992) was the culmination of a global aspiration to commence a process of environmental reforms to save the planet.

These reforms are based on the assumption that the system can be remedied only through collaborative international actions. They call for increased ecological awareness and for a change in thinking that would lead towards an attitude of enlightened stewardship by people in their relationship with nature. While reforms would play a very important role in transforming the dominant economical and political institutions from within, they are challenged by another set of approaches to the environmental crisis.

The adherents of deep ecology, social ecology or ecofeminism claim that the dominant mode of development is inherently wrong. They point to the penetrating cultural roots of the crisis and call for a reconceptualization of sustainable development based on equitable relationships between human beings and nature. All these positions within the ecological movement, whether they be reformist or radical, reflect the current disenchantment with the dominant mode of development. Whatever the position on the humankind/nature relationship may be, industrialization, urban expansion and consumerism are no longer seen necessarily as positive attributes of progress. It is increasingly recognized that they are a large part of the cause of today's problems and that the current economic and social development model as such is at the very root of the ecological crisis. This in turn calls for a new concept of development that includes sustainability as well as proposals for making it operational.

The definition most often referred to comes from the report of the Brundtland Commission: "Sustainable Development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs....Sustainability development requires meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life". Although the report is generally praised for its diagnosis of the global crisis and for highlighting the connections between the environmental crisis and poverty, it has suffered considerable criticism from more radical groups for its position on economic growth.

In many proposals, sustainable development is linked to participatory democracy that would reduce the scale of different forms of social organization and transfer State powers to local communities. These links are explicit in the manifestos of the "green" parties and ecological movements in the industrialized world as well as in the voice of ecology and development movements in less developed countries.

Within most countries, there is growing recognition of the need to protect the traditional interests of indigenous minorities who have already sustainable systems of resource use. It is important that in the pursuit of larger sustainable development goals, the rights of these groups are not over ridden or encroached upon.

Some environmental economists are attempting to put monetary values on the environment and to include these measures in cost/benefit analysis of development proposals. This approach has been criticized by some as being one-dimensional and reductionist since it cannot take into consideration items for which there is no market place. In developing countries the prevalence of non-market subsistence and informal sector activity contributes to the major difficulties in arriving at valid solutions methods, but work to overcome these problems is progressing particularly in the area of unpaid work of women.

Social ecology sees the integration and cooperation with nature as the fundamental social model, with a corresponding shift toward smaller-scale political structures and a heavy emphasis on equality at the local level, i.e. participatory democracy. This would have as its intended effect a completely new concept of modernization based on a renewed ecological consciousness and new sciences arising from technologies that are more appropriate to smaller, local requirements. A more extreme version of this theory is "Deep Ecology", which is based on the concept of the mutual interdependence of human society and the environment and derives from some Eastern traditions.

Eco-feminism is similar in its goals but different in its reasoning. It too, seeks environmental sustainability through the decentralization of power and a reordering of the relationship between nature and the community. The main emphasis here, however, is on countering male domination over both women and nature. Eco-feminists see equality as being achievable only through the full acceptance of the value of differing cultural and ethnic traditions.

These examples of differing schools of thought provide the raw materials from which to produce a synthesis of theories and practices capable of leading to sustainable development. This new analysis could provide a framework for future policy planning to change present principles and practices in ways that are both far-reaching and fundamental. The complexity, nature and extent of the current crisis in development demands new solutions that can only arise from more participatory, interdisciplinary and cross-sectoral approaches to the problems. The linkages between macro and micro levels and the lessons learned from women in development should be used as an integral part in the search for a framework for sustainable development.

3. Guiding Mandates and Principles of the United Nations System on WED

The United Nations Decade for Women: Equality, Development and Peace recognized the important linkages between the role of women in development and the protection of the environment. General Assembly resolution 45/129 on the implementation of the Nairobi-Forward Looking Strategies (NFLS),stressed the importance of the total integration of women in the development process and emphasized women's participation in national and international ecosystem management and control of environmental degradation. By addressing the issue of the Environment within the chapter on "Development", the NFLS recognized the importance of the intrinsic linkage between environment and development and the important role that women could play in balancing the requirements of each. Several conventions, including the Convention on the Elimination of All Forms of Discrimination against Women (General Assembly resolution 34/180) as well as ILO and UNESCO have also called for the end of gender-based discrimination and ensure women's access to land and other resources, education and safe and equal employment. The General Assembly in resolution 46/167 " Women, environment, population and sustainable development" calls upon relevant organs, organizations and bodies of the United Nations system to coordinate and strengthen their efforts to contribute substantially to data collection and capacity-building in the field of women, environment, population activities and sustainable development. The Commission on the Status of Women in its resolution 36/6 of the 36th session, entitled "Women and the Environment", urged Governments "to adopt laws, policies and programmes to promote women's participation in the preservation of the environment...". Effective implementation of these mandates will depend on the active involvement of women in economic and political decision-making.

Working towards this goal, the Global Assembly of Women and The Environment "Partners for Life ", (Miami, Florida, November 1991), was convened under the sponsorship of the Senior Women's Advisory Group (SWAG) to the Executive Director of the United Nations Environment Programme (UNEP). This meeting was one of the major events held prior to the United Nations Conference on Environment and Development and was the culmination of a series of four regional meetings on women and environment. Attending were approximately 218 women from 70 countries, both developed and developing, who presented their success stories on activities related to global ecological issues, principally water, waste, energy and environmentally friendly systems, products and technologies. One of the aims of the event was to establish a process to help institutions, women and men to set new benchmarks for working together to advance environmental management which is affordable, sustainable, visible and replicable. The success stories provided the basis for the development of five regional action plans which are to serve as impetus for the replication and advancement of environmental management efforts.

4. United Nations Conference on Environment and Development (UNCED)

The United Nations Conference on Environment and Development, held in Rio de Janeiro, Brazil from 3 to 14 June 1992, was the largest gathering ever of Heads of State, United Nations bodies and agencies, non-governmental organizations, women's organizations, environmentalists, etc. Two major documents were adopted, namely: The Rio Declaration on Environment and Development and Agenda 21.

The Rio Declaration is a set of 27 principles to govern the economic and environmental behaviour of both nations and individuals. Its goal is to establish a new and equitable global partnership through the creation of new levels of cooperation among states, key sectors of societies and people. Principle 20 states that: Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.

Agenda 21 is a blue print for action to the 21st century. It is not a one-time prescription for solving all the problems of our Planet. Its 115 programme areas provide the framework for co-operation amongst Governments and the many other institutions and sectors of society that must be engaged in its implementation to effect the transition to sustainable development.But it can only be implemented by actions taken at various levels - local, national and regional - by a broad range of organizations, governmental and non-governmental. Its goal is to cover all areas where environment and development intersect and where major social groups are affected. However, provisions must be made for the active participation in its work of all parts of the United Nations system, financial institutions and other entities outside the United Nations system, as well as representatives of the non-governmental sector, including women's organizations - in other words all those who together with Governments are the major actors in the evolving global partnership for sustainable development.

5. Obstacles and Problems

5.1 Women, Population Growth and the Environment

The world's population is now growing by about 1.7 per cent. From 1970 to 1990, the world population grew by 1.6 billion people: 90 percent of that population increase was in developing countries. During the period 1990 - 2030, the world's population is likely to grow by 3.7 billion. 1/ Over the next four decades the expected regional population increases are from 500 million to 1.5 billion in Sub-Saharan Africa; from 3.1 billion to 5.1 billion in Asia; and, from 450 million to 750 million in Latin America.2/

In 1987, the United Nations General Assembly called for more attention to be placed on the links between population, consumption patterns, poverty and the natural resource base. Population growth brings increasing pressure to bear on limited resources but so do high rates of consumption. Population growth also increases the need for employment, which - especially in crowded rural areas - exerts additional direct pressure on natural resources. Countries with higher population growth rates have experienced faster conversion of land for agricultural uses, thereby placing additional demands on the land and natural habitat. On the other hand, people in the industrialized world consume the earth's resources in the form of manufactured products at higher rates. Poverty has been aggravated by an exploding population. High fertility rates usually occurs in areas of high infant mortality and for the mothers this means poor health, poor nutrition, increased domestic drudgery and continued poverty; a demographic Catch-22. However, population explosion is not the sole cause of environmental degradation and its control is by no means the total solution. Because environmental degradation is due to a complex web of contributing factors, the solution will have to address many issues simultaneously.

5.2 Women, Poverty and the Environment

Alleviating poverty is a prerequisite for sustainable development. The poor are both victims and agents of environmental damage. About half of the world's poor live in environmentally fragile rural areas where they rely on natural resources over which they have little control. Poor people in peri-urban areas frequently have inadequate access to safe water and sanitation, and are exposed to flooding and landslides, industrial accidents and emissions and transport related air pollution. The poor are thus often faced with the greatest environmental health risks.

Women's work covers every sector of the economy: women grow, process and market food, make goods and provide services. But it often remains unpaid or under-valued.There are millions of women involved in the informal sector yet their contribution to the economy is not adequately recognized. These women are usually illiterate, they frequently work under unhygienic and hazardous conditions and as already noted have little access to credit facilities and training. Children often work with mothers and are more vulnerable than adults to harm from chemicals and other pollutants but often lack adequate protection. Usually, women have no choice but to accept these working conditions, especially if they are the heads of households.

To break the vicious cycle of poverty and to empower women to become the agents for urgently needed changes there is a need to change policy, to increase women s productivity through training, investment, improved technology and an improved institutional framework. Access to land; to credit; to improved transportation; and better working conditions are essential to alleviate poverty. Furthermore, it has been clearly demonstrated that improved levels of living for the poor, including improved economic opportunities reduce, in the long run, pressures on the environment.

5.3 Women, Water and Human Health

Water is a prerequisite for the survival of human beings and their development. However, inadequate water and sanitation facilities constitute some of the most critical problems faced by the developing world today.

Statistics tell the story. In this decade, over 1 billion people in the developing world lack safe and adequate drinking water, while those lacking sanitation number almost 2 billion. The lack of a healthy environment and safe drinking water are the cause of 900 million cases of diarrhoeal diseases every year, which cause the deaths of more than 3 million children; 2 million of these deaths could be prevented if adequate sanitation and clean water were available. At any time 200 million people are suffering from schistosomiasis or bilharzia and 900 million more from hookworm, cholera, typhoid or paratyphoid. 3/

Ever increasing water scarcity and environmental degradation continue to have serious impacts on primary water carriers, managers, end-users and family health educators: women. The average proportion of time spent by women on water collection in East Africa varies from about 12 per cent in humid areas to 27 per cent or more in dry or mountainous areas. Since women are responsible for the domestic use of water as well as for the provision of household fuels and for the production of food crops, they are the ones most affected by changes in land use. In projects concerned with water resources development, river basin development projects and environmental protection, women are rarely included in the planning. Despite their important and multiple involvement in resource use, their water-related work has been taken for granted and its economic and social value unrecognized.

5.4 Women and Energy

In 1980 approximately 100 million people in developing countries could not get sufficient fuelwood to meet their minimum needs and 1.3 billion people consumed fuelwood faster than they could be replenished. By the year 2000, without remedial action, 2.4 billion people will be either unable to obtain their minimum energy needs or will be forced to consume wood faster than it is being grown.4/

The consequences of inadequate energy sources are extremely serious. Women in rural and peri-urban areas are most severely affected. They are collectors of fuel, family educators, motivators and agents of change. They are directly dependent upon the natural resource base and sustainable natural systems are fundamental for the survival of their families. Women often spend several hours a day fetching fuelwood which constitutes, in Africa for example, 90 percent of the household fuel used in Africa. Deforestation and desertification affect access to water, fuel and fodder thereby causing women to walk further and further each day to obtain these essential items for survival. In many cases the lack of food is not the sole cause of famine. Rather it is food shortage and the lack of fuel with which to cook the food that create the most severe famine conditions.

Women as principal consumers of various sources of energy are both part of the problem and part of the solution. In developing countries, women provide much of the human energy required for subsistence needs and are the primary users and providers of household energy. In developed countries, women influence patterns of energy consumption through their choice of technologies. Thus, women throughout the world bear the consequences of declining energy resources and rising prices and have a major interest in more effective and sustainable energy resources. Therefore, it is necessary that women be included at every level in the decision-making processes concerning energy production and use.

However, the main constraint to achieving the full integration and participation of women in energy - related activities is a lack of appreciation by decision-makers of the key role that women can play. They do not recognize that women participate in energy planning could contribute essential knowledge and experience that could lead to a higher probability of successful outcomes.

5.5 Women, Land and Habitat

The estimates of agricultural land either damaged or lost from soil degradation range from moderate to catastrophic depending on the region. World-wide approximately 25,400 million tons of material are removed from topsoils and from excessive erosion. Per capita arable land decreased from a world average of 0.38 hectares in 1970 to 0.28 hectares in 1990, due to population growth and to the loss of agricultural land.5/ Land is of primary concern to women in both developed and developing countries. In order to consider women's access to land it is necessary to analyze the legal restrictions women face including the increasing number of female-headed households. For example, in Sub-Saharan Africa, women provide an estimated 50-80 per cent of all agricultural and agroprocessing labour. Despite such high levels of economic activity, women in many countries have only limited rights of tenure or no rights at all to land and therefore to sustained cultivation. In turn, this lack of collateral constrains women's access to credit for investments in new technologies that could increase productivity without depletion of the resource base. Unless women's access to land is improved and discriminatory practices abandoned, women in both rural and urban areas will be further impoverished. In rural areas the result will be an overall reduction of agricultural output and increased migration. In urban areas there would be increase management.

Macro-economic trends, particularly the continuing world economic crisis, have negatively affected the shelter conditions of women. Fewer employment and income-generating opportunities have resulted in more homeless women, and reduced social expenditures on child care and education have pushed women into marginal, temporary and low-paid jobs. For the majority of women in developing countries the challenge is still one of the survival and the fulfilling of the basic needs of their families. However, continuing discrimination means that their needs are secondary to those of men. It is essential that plans for human settlement activities contain a specific focus on women.

5.6 Women and Forestry

Forests, coastal and inland wetlands, coral reefs and other ecosystems are being converted or degraded at rates that are high by historical standards. Tropical forests have declined by one-fifth in this century alone. The loss of forests has severe ecological and economic costs. These include lost watershed protection, local climate change, lost coastal protection. For about 200 million people, forests are their only home. They provide fuel and construction wood, animal products and fodder, vegetables, fruits, nuts, medicine and many raw materials for industry such as: oils, rubbers, waxes, fibres, etc. Deforestation is one of the world's most pressing land use problems and the selective logging of closed forests causes enormous degradation. Conversion to agricultural land is also a major cause of deforestation. Other important factors are commercial timber logging, planned migration, resettlement and large-scale construction projects. At the local level growing demands for firewood and fodder contribute to their loss.

With so much pressure on the land, women have little choice but to use forests. If they are not given alternative sources of energy they will have to continue collecting fuel wood for survival. At present, women's participation in environment development is impeded by many factors. Competition for land, including problems over land tenure may deprive them of access. Moreover, women often lack institutional or organizational support. If a balance between greater productivity and environmental protection is to be achieved policy makers must ensure that agricultural and forestry extension services include women in decision-making fora and build upon their knowledge of community concerns.

5.7 Conclusion

In many parts of the world women play a central part in resource management and yet they are the most vulnerable to change because they are rarely consulted by policy-makers. As a result, they have less access to education, credit, extension services, and technologies than do men. Women's unequal treatment in environmental concerns is a product of historical and contemporary discrimination and fails to take account of objective reality.

Women are not a new dimension in the environmental field. It is clear that they have an important managerial role to play vis a vis the environment. However, what is needed is structural and attitudinal change in institutions including new management systems in human, financial and natural resources. Research and data related to WED as well as new methodologies in development planning and projects utilizing environmentally sound technologies and mechanisms are needed. This will facilitate the involvement of women in all phases of sustainable development. One of the ways to achieve this is through human resource development which has been emphasized in the technical cooperation programmes and projects within and outside the United Nations system. At the heart of the human resource development is training. That is the goal to which INSTRAW is committed.

6. INSTRAW's Action on WED

Since 1982, INSTRAW has shown concern for environmental issues as evidenced by the priority the Institute accorded to programmes related to women, water supply and sanitation and new and renewable sources of energy. To this end INSTRAW developed two innovative multi-media modular training packages, one on water and one on energy, aimed at development planners, policy-makers and non-governmental organizations. The underlying message is that women must be integrated at the earliest stages of development process to ensure their full participation in planning, technical operations and projects. INSTRAW has also developed simple training tools on women and water for grass-root audiences that lack literacy. In order to disseminate these packages, women's organizations are encouraged to undertake the promotion and use of these training packages at the national level.

Continuing its activities in water and energy but now broadening the scope, INSTRAW launched a new programme in 1990 on women, environment and sustainable development. As part of this programme INSTRAW carried out a comprehensive review of the theoretical/methodological approaches which have been used in dealing with women and the environment. This research study was undertaken jointly by INSTRAW and the University of Utrecht and the Institute of Social Studies in the Netherlands. It will be published by INSTRAW and ZED Books in late 1992. As a complement to this theoretical and conceptual study, INSTRAW is also working on case studies in several parts of the developing world in order to identify the major environmental problems affecting women. The results will appear in the first issue of a new INSTRAW publication aimed at academics, policy-makers and the general public.

In all its programmes, the Institute places great importance on the development of training materials. Special emphasis has been placed on the preparation of training materials in the field of environment as they will contribute toward the full understanding of the multi-faceted relationship between women, environment and sustainable development. These training materials will be based on Agenda 21 and be directed to policy-makers, development planners and managers at the national, regional and international levels. Furthermore, to ensure that the women's dimension becomes an integral part of all future actions within Agenda 21, a combination of research, training, information and activism is needed. INSTRAW is committed to contributing to all these areas. Sustainable development cannot become a reality without the full participation of women.

Notes

1/ United Nations Environment Programme (UNEP): State of the Environment Report, 1972-1992 and World Resources 1992-1993 (World Resources Institute, in collaboration with UNEP and UNDP 1992).

2/ The World Bank: World Development Report, 1992 (London: Oxford University Press 1992).

3/ The World Bank: Ibid.

4/ United Nations Environment Programme (UNEP): Ibid.

5/ United Nations Environment Programme (UNEP): Ibid.

Critical Links
Women, Population, Environment and Sustainable Development

(Agenda item 7(b) of the Provisional Agenda)

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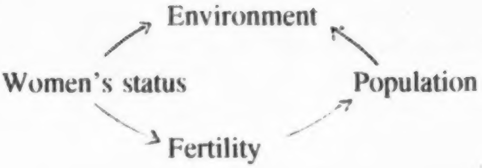
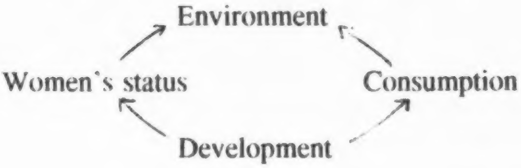
In uncovering critical links between women, population, and environment in order to define women's role in sound environmental practices so as to ensure sustainable development, it would be useful to classify women's role into three main categories: consumers, producers and reproducers. Obviously, there is considerable overlap between these three roles, reflecting multiple duties that women must carry out. For example, women in economically active age groups are likely to fall in all the three categories, while female children would only fall in the first. Women of child bearing age who are neither economically active nor are housewives (which is rare) would only fall in the third category. Before analyzing how decisions made and activities undertaken by these three categories of women,1/ affect the environment, and consequently sustainable development which in turn impacts women's status, it is useful to look at a hierarchy of interrelationships (not necessarily derived from empirical data) that are present among women's status, population, environment and sustainable development.

Linkages between Women, Population, Environment and Development

Women's Status	Population Response	Environmental Consequences
Women's Status	Environmental Response	Development Consequences
Environment	Development Response	Population Consequences
Development	Population Response	Environmental Consequences

The conceptual framework suggested above can also be illustrated through simple models (as below) which, in addition to the factors accounted for above, also reflect consumption which is one of the prime determinants of the impact of women's status on environment.





Two basic interrelationships that have been responsible for the present critical situation regarding environment on the one hand and women on the other are: 1) currently employed models of development can only lead to environmental degradation and, 2) the fast deterioration of the environment due to patterns of consumption and population growth is allowing little time to undertake slow, experimental type, adjustments. In other words, time is of the essence and every day lost impinges even further on posterity. The first point above has been very eloquently described by Agarwal(1992) "...the present model of development has not succeeded either in providing sustenance or in ensuring sustainability". Models of sustainable development must address the quality of human life while simultaneously respecting nature.

Although investigations are underway, further information and quantitative data are necessary to unravel the strength and direction of the inter-relationships among the factors identified above. These factors should be used as basis for planning and policy formulation, and especially for determining critical interventions at the planning stage, and not as merely corrective measures after plans start to go awry. " What remains lacking is a broad base of empirical support, research and policy analysis of population/environment/women linkages at the country level" (Shaw, 1989). The pivotal question to be addressed is: what interventions best ensure a safe environment and sustained development while guaranteeing women's equitable participation in development as both contributors to and beneficiaries of development? Another relevant question is, where are the current trends in resource consumption and population growth taking us?

A useful way of looking at this problem is as stipulated as follows: "The equation has three components. First, lifestyles, income and social organization determine levels of consumption. Second, the technologies in use determine the extent to which human activities damage, or sustain, the environment, and the amount of waste associated with any level of consumption. These two factors in the context of women's status - our main focus in this paper is on the third factor (identified by UNFPA in its 1990 study): the impact of population on the environment and the impact of women's status on population growth.

Reverting to the question how women tend to encroach on/misuse/overuse environment in their daily lives, and the three categories under which this can be analyzed, it is valuable to first define these three categories.

Consumers: This class includes all women. Women's consumption patterns relevant for determining their impact on the environment and on development should be looked at in the following areas: (i) self-sustenance; (ii) sustenance of those for whom women are responsible for such as family/household members etc.; and (iii) ostentatious consumption (which is not essential for survival). In short, this category accounts for the impact of decisions and activities, determined essentially by women's status - which lead to consumption - on environment and environment's response which has implications for sustainable development.

Producers: This category includes women in economically active age groups, i.e., women in the rural agricultural (including animal husbandry and fishery) sector, rural informal sector including cottage industry and handicrafts, rural formal sector, urban informal and formal sectors. The aspects relevant for analyzing the impact on environment of women's productive activities are: (i) quantity and intensity of use of natural resources and manmade inputs employed in production; (ii) techniques of production and (iii) modes of disposal of unusable outputs/byproducts of production.

Reproducers: This category includes women of childbearing age who are actual contributors, or have the necessary requisites for contributing, to population growth (through fertility). The impact of this female role on the environment and sustainable development occurs through population growth. This aspect is treated in this paper most thoroughly, as its objective is to obtain an indepth understanding of linkages between population, environment and sustainable development.

In the context of the inter-relationships traced above among environment, sustainable development, population and women's status, and keeping in mind women's roles/activities in their daily lives, it is useful to see how these roles/activities can be conducted in such a way that they not only optimize women's empowerment but result in sustainable development based on environmentally sound practices.

Women, Production, Consumption and Environment

Since women as consumers comprise the most comprehensive category (it includes all women), we may first look at how their consumption patterns impact the environment on the one hand and sustainable development on the other (these are two-way relationships). We also review how the resulting consequences of these interrelationships affect women's status. We hypothesize that most of women's production, especially in the Third World rural households,(women in this category account for over 60% of world's women), is used for family/household consumption. Such production is intertwined with consumption of natural resources (...for women often give greater priority in their spending then men do to family health and good nutrition...Joekes 1989). Hence we treat together the consumption and production aspects that have a bearing on the environment and simultaneously examine their combined impact on women's status.

It is important to bear in mind that women are the prime environmental managers in their roles as producers and consumers in resource-poor settings. "Environmental policies which fail to recognize this fact and to ensure that women have the means and incentive to improve their situation will bypass the main actors and/or remove the critical basis for subsistence from poor households" (Joekes, 1989). In order to study the impact of women's consumption-production functions on the environment, it is necessary to obtain a clear understanding of the factors which determine their relative inability to control and exploit resources for their own benefit. To ensure sustainable development, women's natural resource management role must reflect maintenance of natural resources at levels that permits their regeneration, ensures quality and meet future as well as present needs. Simultaneously, it is important to bear in mind that while women are managers of natural resources (and thereby of the environment) they are also passive acceptors of environmental impact on them caused by institutional factors, gender division of labour, distribution of power, property, knowledge and resources.

To ease the impact on environment of consumption and production and vice versa it is important to make available to women resources, training in alternative modes of production and conservation of resources and to include women in all levels of decision-making about the development process taking into account the fact that women, especially in rural surroundings, have a special relationship with nature. The consequences of a lack of understanding of the interrelationships between women's roles and development have been amply described in the Egyptian Gazette (1988) by the World Bank Economist, Goetz Schreieber. He describes the impact of insensitivity to the interrelationships cited above are; 1) those women who are responsible for gathering and collecting wood and water suffer increasingly, with the worst burden being on female headed households; 2) in most Third World societies there are systematic gender differences in the distribution of resources such as food and health care etc. which worsen nutritional and health status of women even further with increasing deterioration of environment; 3) there are significant inequalities, by gender, in access to critical productive resources especially in rural areas, including access to land, credit, agricultural extension services and above all education. Women also have a disadvantaged position in the labour market, where they are the last to enter and first to leave when employment opportunities dwindle. Thus, while women are losing their traditionally sound relationship with nature as producers and consumers, the new development models are providing them little option to overusing nature and the environment. This encroachment on the environment has resulted in further dwindling of women's income.

A recent study in Nepal found that the substantial increase in firewood collection time due to deforestation has significantly reduced women's agricultural time. This has led to a decline in the production of wheat, corn and mustard, which are mostly grown by women. Women's increasing disassociation with nature has also impacted nutrition. The declining availability of fuelwood has nutritional consequences; namely persons tend to shift to those foods which take less time to cook. These are less nutritious foods (e.g. elimination of beans). Persons also tend to consume half cooked food, leading to gastro-intestinal problems and the eating of fewer meals. In this shortage of meals it is women and female children who suffer the most in all traditional cultures. The health consequences of lack of inappropriate nutrition are the ones that women bear the most, both personally and in terms of care of the sick of the household.

An additional source of vulnerability is the agricultural tasks that women perform such as rice transplanting, where women must stand for long hours in unhealthy water. Cotton picking and other such tasks expose women to pesticides etc. As a result, unacceptable levels of DDT and BHC residues have been found in breast milk of mothers who are agricultural workers in India.

Women's increasing divorce with nature is also impinging on their traditional social relationships and networks which made interdependence a survival strategy. Such relationships include reciprocal labour sharing during peak agricultural seasons among women, lending of cash and kind in crises (and especially droughts), borrowing of items of food, fuel, fodder etc. Such net-works are rapidly disappearing since rehabilitation planners are ignorant of their critical importance and the value of their facilitation.

Finally, the present development models have ignored the potential that women's knowledge holds about nature, agriculture and the environment as a result of their daily contact with and dependence on nature's resources. Women do not tend to have access to modern scientific knowledge which would assist their operations. Simultaneously, nationalization and privatization leading to ownership and control by a minority has resulted in the disappearance of the material basis on which women's knowledge of natural resources and processes developed.

An experiment by the Chipko movement in Northwest India, has proven that Third World women are dependent on nature for drawing sustenance for themselves, their families and societies. Destruction of nature turns into destruction of the very resource needed by women for survival. Thus, these women have a special dependence on nature and a special knowledge of nature. The depletion of natural resources that most affects women is the disappearance of forests, deterioration of soil condition and depletion of water resources. The impact of such erosions is seen in women, as consumers; increasingly spending inhumanly long hours in fetching water and collecting fuelwood and as producers; having little time to devote to food production, income generation, childcare and other activities that lead to household well-being.

Agarwal (1992) most successfully proves how the present developmental models that lead to nationalization of natural resources on the one hand and privatization on the other, have increasingly deprived rural women in India of their natural resources, increasing their dependence on a few resources that are still spared by the contemporary "development models". These sparse resources are being overused, resulting in a more severe environmental deterioration.

Another factor that adds to this sad scenario is devaluation and marginalization of indigenous knowledge about species varieties, nature's processes and sustainable forms of interaction between people and nature. The best example in this respect is "green revolution" which has seen increasing deforestation, desertification, salination, recurrent secondary pest attacks on crops and pesticide contamination.

The above discussion indicates that a developmental process that permits women to participate actively in the decisions about what is to be produced, its composition, the technology to be used for producing it, and the processes through which decisions on products and technologies are arrived at including the freedom to acquire knowledge and skills required to make sound decisions on the basis of viable options is the best available solution. This necessitates a new and compatible type of administrative structure -- where there is continuous interaction between scientists and the workers/producers at the grassroots level. This also implies the establishment of grassroots political organizations of women so that their voices are heeded.

Women, Population and Environment

Population growth and environmental deterioration have been treated most frequently as two separate issues; they are not. They are aspects of the same problem: how to ensure human, animal and plant survival. Women as "reproducers" have a special responsibility in the worsening interaction between population and environment. Population growth poses a genuine threat to the survival of humanity if the present extrapolations regarding environmental impact on human, animal and plant life are borne out by reality in the rest of the 20th and the 21st centuries. It is expected that even with the expansion of irrigated areas, total cropland per person is likely to decline by over 1 percent while the world population grows by 2 percent per year. The FAO estimates that soil erosion in the Third World where nearly four-fifths of the world population lives will cause agricultural production to decline 20 percent by the year 2000. Population will increase by the same percentage. The "green revolution' has already outlived its usefulness and no other viable, cost-effective solution is in sight.

Although population growth may not be the basic cause of environmental deterioration, it exacerbates the problem. Population growth reduction alone may not be the total solution to the environmental problem but it may "buy crucial time until we figure out how to dismantle more ultimate causes" (Shaw, 1989).
Some scientists believe that lack of water will affect the world's population more and before lack of food. Only 3 percent of the world's water supply is fresh water and much of it is polluted. Salt water is abundant but desalinization is four times as expensive as distillation of fresh water and is therefore inaccessible to most people.

Due to the urgency of raising food production and accommodating growing numbers of people, forest destruction has been occurring at 19,000 acres a day. This process eliminates a large source of oxygen while resulting in the release of large amounts of toxic greenhouse gases into the atmosphere. All the while, soil erosion is speeded -- leading to aridity and desertification. It is estimated that 2 billion people still depend on wood for heating and cooking and three-fourths of them are cutting wood faster than it is growing back. The rate at which forests are being cleared outpaces the rate of afforestation by a factor of four to one in Asia, ten to one in Latin America and twenty-nine to one in Africa. By early 21st century there is expected to be virtually no rain forest left. If this were not bad enough species loss leads to the permanent impoverishment of the world's biological diversity and has unknowable impacts. Scientists estimate that we are losing 1000 to 2000 species a year, many of which have never been discovered or studied and many of which hold secrets to new medicines, foods and other uses.

Global warming grows unabated, causing dramatic shifts in weather patterns, including draughts and spreading deserts, and the melting of polar ice which raises sea levels so as to flood coastal areas and whole countries. Rising quantities of greenhouse gases will further raise the world's temperature. The amount of carbon dioxide has increased 25 percent since the beginning of the industrial revolution in Europe. Developed countries account for about two-thirds of the world's carbon dioxide emissions due to higher per capita consumption and waste production in the industrialized world. Hence some believe that this problem can be resolved by reducing the per capita consumption in the West. However, the exploding populations of developing countries want similar consumption patterns as the West -- which contributes to greenhouse effect. As a result of very rapid population growth and of energy use it is estimated that by 2025 developing countries could emit four times as much carbon dioxide as the industrialized countries today. Modestly reducing population growth rates in the developing countries could be as important in reducing carbon dioxide emissions as reducing deforestation by 97 percent. As farmers expand production to feed growing populations, methane gas and nitrous oxide increase in the atmosphere as well.

Additionally, chlorofluorocarbons (CFC) from air- conditioning and cars are destroying the earth's ozone layer. Holes in the ozone layer hold a tremendous threat to life on earth. Every one percent drop in ozone leads to a four to six percent rise in skin cancers. But as the use of refrigeration for food preservation increases emission of CFC will increase. In general, in the future the biggest potential for ozone damage lies in the industrialization of the Third World. Unless the industrialized world is willing to bear the costs of cleaner technologies much of this industrialization will follow the quickest, cheapest and dirtiest route.

Such is the real threat to life on earth due to hostile interaction between population growth, hazardous consumption and the environment. Efforts to protect the environment and attain sustained development require a variety of concerted actions including conservation of resources, introduction of new technologies, and institution of economic and legal measures to prevent and clean up pollution.

Slowing population growth by reducing fertility is another essential requirement. The key to this problem rests in reaching replacement-level fertility as soon as possible, preferably, through voluntary acceptance of family planning. The present fertility level is 3.4 children per woman -- which is too high to reach compatible population growth rates in a short time. However a number of social programmes are necessary; (i) making family planning, including a variety of methods of contraception, available to women who want it; (ii) encouraging later marriages and longer spacing between births; (iii) encouraging breast feeding to promote infant health and lengthen the interval between pregnancies and (iv) improving women's status and opportunities for education and employment.

It is estimated that despite vigorous efforts, both nationally and internationally, some 300 million couples in the developing countries have no access to family planning. It is crucial to remember that in subsistence economies, children are hardly a responsibility; rather they are a "technological solution" to women -- especially regarding labour. However, rapid improvement in infant and child mortality has reduced the need for "insurance births". Women are becoming keenly aware of successive depletion of health and energy caused by frequent and badly spaced pregnancies. This adds to women's role as resource managers, controllers of quantity and quality of human capital available to the family firm, producers, managers of resources, and sustainers of health and well-being of the family.

Unfortunately, the rate at which family planning practice is spreading is not compatible with the reduction in population growth required to reinforce women's roles as producers and consumers to ensure environmental protection and sustainable development. It is estimated that over 50 percent of the developing world's couples already have access to family planning technology and they are employing some birth-control method. However the rate at which acceptance is growing is thoroughly disappointing. It is of prime importance to identify the reasons why the 300 million couples who would like to contracept cannot be reached. There may be cultural taboos, prejudices, lack of knowledge of the variety of methods available, unfriendly/hostile clinical environment, unsympathetic relatives, among many others. Through the same means that were used to estimate the 300 million couples as not having access to family planning the reasons for non-accessibility should be established and immediate steps taken to remedy them. It has been established rather successfully that mass media, and especially television propaganda and "soap operas" help to convert people more readily to contraceptive use. Therefore, such media techniques and other necessary measures should be employed as a priority. The annexes to this paper describe two proto-type project proposals in this respect.

Conclusion

The most productive approach to reinforcing women's role in environmental protection, and thereby sustainable development, is the one that rests on an analysis of the distinctive features of women's socio-economic status and an understanding of the factors which determine their relative inability to control and exploit resources for their own benefit. Measures to promote sustainable development must be compatible with environmental goals that ensure protection of human, animal and plant life at a desirable, cost-effective and dignified level. Programmatic interventions that can be proposed for strengthening women's contribution to protecting the earth and the environment should be based on a careful study of institutional and other constraints on women's activities. Such interventions can only be successful if appropriate methods for implementation are put in place. Among the measures suggested, improving women's status, ensuring their equitable participation in decisions regarding production and technologies to be employed and assisting women to have complete control over their reproductive role have proved most promising and should be encouraged.

Notes

1/ Note that these decisions and activities could be either due to sheer habit or health, family, cultural, communal, social, economic or technological exigencies or pressures.

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Women, Environmental Health and Sustainable Development *

(Agenda item 7(b) of the Provisional Agenda)

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Introduction

Sustainable development is defined by the United Nations-established World Commission of Environment and Development as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs."1/ This definition has evolved to encompass economic, human, environmental and technological dimensions.2/ In considering environmental health issues related to women in developing countries, it is impossible to draw clear boundaries between these dimensions because they are core issues for the women and are intertwined in their lives in pervasive and complex ways. For the most part, women have not been involved in the development process, they have not benefitted from it, and their work has been undervalued. To illustrate this point, consider that women comprise one-half of the world's population, yet they supply two-thirds of the labor-time and receive only one-tenth of the total income and own less than one hundredth of the world's goods.3/ The result is that much development has significantly and detrimentally affected women's lives by placing additional burdens on them and causing their health and the health of their children to suffer.

This paper provides a broad overview of the environmental health threats and exposures suffered by women in developing countries and illustrates that in large part, these health conditions exist because of the failure to consider the effects of development on women and because of the failure to involve women in the planning and implementation of sustainable development programs.

II. Environmental Health Issues in General

A. The scope of environmental health

In addressing issues related to the environmental health of women in developing countries, one might first consider the adverse health effects caused by exposures to chemical pollutants such as heavy metals, pesticides, and the like. These exposures are important to investigate, but in general have been little studied compared to malnutrition and infectious diseases. But even if not for the sparse chemical exposure data, it is appropriate and necessary to expand the scope of environmental health for these women because their broader environment, which includes their economic and social conditions, more pervasively affects their health than toxic exposures. The broader environmental conditions also dictate that women carry out inseparable productive and reproductive roles. For example, women who are required to spend more time performing agricultural tasks have less time for domestic activities such as cooking and child care. This results in a trade-off that affects family nutrition and development, particularly for the children. Because the health of the children is so strongly correlated with the women's activities and health, certain children's health issues are discussed.

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* The views expressed in this paper are those of the author and do not necessarily reflect the opinion of the United Nations.

B. Poverty, environmental degradation and malnutrition

Approximately 75 per cent of the world's population are among the poorest, and women comprise the majority of that percentage.4/ The complex cycle of poverty, inappropriate development and environmental degradation have forced poor persons to live in a way that further induces degradation' women in the third world are frequently without another choice but to exploit natural resources in order to survive, even though they may have knowledge to promote sustainability.

> Those who are poor and hungry will often destroy
> their immediate environment in order to survive;
> they will cut down forests, their livestock will
> overgraze grasslands; they will over use marginal
> lands; and in growing numbers they will crowd into
> congested cities.5/

In addition, poverty also breeds the health-threatening and potentially life-threatening condition of malnutrition. Two-thirds of women in developing countries already suffer from anemia and malnutrition.6/ And because malnourished mothers have malnourished babies, it is not surprising that more than one-third of their children under the age of five also suffer from malnutrition.7/

The effects of environmental degradation require women to devote more time to obtaining fuel and water. The result is that the women have less time for the production and preparation of food, which exacerbates the already-present malnutrition of the women and their children, less time to improve family welfare, and less time to improve their economic status by increasing household income or pursuing their education.

C. Malnutrition, infectious diseases and toxicants

As briefly mentioned above, adverse health effects suffered by women in developing countries from exposure to toxic chemicals are an important but relatively little studied public health problem. At present, it appears that those exposures and resulting adverse health effects are not as pervasive as those caused by malnutrition. These toxic exposures are not to be overlooked, however, especially because the additional insult can significantly diminish the already-compromised health status of women.

Malnutrition is the most prevalent serious problem contributing to disease susceptibility in developing countries.8/ Malnutrition severely compromises resistance to viral, bacterial, fungal or chemical agents.9/ For example, a respiratory tract infection that would not be a significant medical event for a well-nourished child may cause death in a malnourished child 10/, demonstrating that deficiencies in certain proteins, vitamins and essential elements such as iron and zinc reduce the effectiveness of the body's immune system to stave off illness. But even in circumstances in which specific nutrients essential to good health are present, exposure to toxicants can interfere with their metabolism.

The immune system itself can be directly and adversely affected by malnutrition, disease and environmental chemicals. Indirectly, it can be depressed by malnutrition and exposure to toxicants.11/

While a person with compromised health status may recover from one or two of these insults, the same may not be true when a number of factors are simultaneously combined. Malnutrition, acute and chronic infections, cancer, and toxicants can depress primary and secondary immune responses.12/ Infectious diseases and toxicants also affect nutritional status, which lowers resistance to secondary infections or to other toxicants.13/

III. Degradation of Agricultural Lands and Related Health Effects.

Women are central to world food production and produce more than 80 per cent of the food in some countries.14/ The effects of the degradation of agricultural lands are not limited to women, but many such effects are confined to them because of the gender-specific division of labor in rural agricultural societies.15/

The degradation of agricultural lands in developing countries is caused by a number of factors, including overgrazing by livestock (35 per cent), agricultural procedures and technologies (28 per cent), deforestation (30 per cent), overexploitation for fuelwood (7%) and industrialization (1 per cent).16/ These factors contribute to the decrease of land available for producing crops, thereby further stressing the tension of a decreased food supply for existing populations and the demand for the same from a rapidly growing third world population estimated to account for approximately 80 per cent of the world's population by the year 2000.17/ A decrease in the food supply is particularly threatening to the health of two-thirds of the women in developing countries who, like most of their children, suffer from malnutrition.18/ A decrease in productive farmlands also threatens the livelihood of the significant numbers of women who make a living in the agricultural sector. The loss of livelihood undoubtedly keeps them locked in poverty.

The implementation of certain agricultural procedures and technologies, such as forced crop economies and the use of pesticides and fertilizers causes adverse health effects. For example, forced crop economies frequently rely on new technologies that may have unexpected ecological outcomes, such as the contamination of groundwater from agricultural chemicals, the exacerbation of insect mutations from pesticides and the increased use of fossil fuel products that contribute to air pollution.19/ More specifically to women, however, forced crop economies can exacerbate the frequently compromised health status of women by demanding they contribute an increased amount of time and labor in the fields for planting and harvesting. In Zambia, for example, women do 60 per cent of the agricultural work and in addition are expected to carry out domestic chores that take twice as long.20/ This has led to a high incidence of ill health and poor nutrition among the women.21/ The adverse health effects caused by the introduction of forced crop economies further contribute to the malnutrition of the children because the women have less time to prepare food for the family.22/

The environmental health of women is also threatened by exposure to pesticides used in agricultural activities. Pesticides are being used with increasing frequency in developing countries as the trend for growing cash crops for export remains a focus for improving economic conditions. Although 80 per cent of pesticide use is in industrialized countries, nearly all acute poisonings occur in developing countries where some pesticides banned in the United States have in the past been exported. Pesticide poisonings occur primarily in developing countries and may cause 20,000 deaths and illnesses per year. The incidence of unintentional poisoning, however, is poorly documented.23/

Only recently has it been determined that pesticide exposures induce immune system dysfunction.24/ This is a finding of particular importance to women who work the agricultural lands, such as women field workers in Nicaragua who are exposed to pesticides by using them without protective clothing or proper equipment and training.25/

If their health is already stressed by malnutrition, they are sensitive to further insult from environmental toxins, as the malnutrition and toxic chemicals interact with each other and the immune system.26/

IV. Degradation of Forests and Related Health Effects.

Deforestation in developing countries is caused by a number of factors, including clearing the land for fuelwood, clearing the land to accommodate the increasing populations and clearing the land for timber to sell for economic purposes. Stripping the land for firewood causes wind and water erosion of the soil, estimated to be 7 per cent worldwide and as high as 13 per cent in Africa.27/ Clearing the land for population settlements accounts for approximately 40 per cent of soil erosion in Asia and South America.28/ Further deforestation of tropical lands for agricultural and/or urban uses through the 1980s increased by 50 per cent by the 1990s.29/ Firewood is the main source of energy in Africa, but it is increasingly difficult to find as the land is cleared for economically-driven cash cropping.30/

Deforestation and soil erosion affect the broad public health by decreasing land available for food production. Both conditions specifically affect the health of women as well. Women in developing countries spend a substantial amount of time each day gathering wood. In Sri Lanka for example, women spend 65 per cent of their total workday collecting firewood. In sub-Saharan Africa, the scarcity of firewood nearby forces women to spend longer time looking for fuel.31/ Women compensate for this lack of wood in two ways. First, women prepare fewer cooked meals because they have less time available for domestic activities. This serves only to exacerbate their malnourished condition and that of their children. Second, the women supplement or replace wood with crop residues that create significant exposures to indoor air pollutants produced from the burning of unprocessed solid fuels (e.g., coal) or biofuels (e.g., wood, crop wastes or dung) used in unvented stoves for cooking and/or heating. Such pollutants include particulates, nitrous oxide, carbon monoxide, sulfur dioxide and aromatic hydrocarbons, some of which are considered to be carcinogenic. These exposures create public health risks to women who traditionally conduct cooking and heating duties and to their children who typically are with them in these environments.

The World Health Organization (WHO) estimates that approximately two-thirds of the world's population, primarily rural, burns these traditional fuels with poor or no ventilation in rural indoor environments.32/

The estimate of the range annual particulate exposure in a rural indoor environment in a developing country is 300 micrograms per cubic meter of air (ug/m3) to 14,000 ug/m3.33/ The WHO's maximum recommended level is 100-150 ug/m3.34/ Measurements of particulates from biofuel combustion in India showed particulate levels of 18,300 ug/m3 while cooking with dung and 15,900 ug/m3 while cooking with wood.35/ A study conducted in China measured particulate levels of 18,800 ug/m3 while cooking with wood.36/ A WHO study found particulate levels more than 20 times greater than the WHO guidelines in houses where crop wood or crop residues were used for cooking in rural Kenya.37/ Exposure to such high emissions can significantly affect women's health by causing chronic lung disease, heart disease, cancer and acute respiratory infections. These findings prompted the conclusion that "exposure to indoor fuel emissions is the most important occupational health hazard for women in developing countries."38/ Children in developing countries face many health risks, yet it is believed that particulates released from burning wood and animal fuels in traditional stoves are a major contributor to acute respiratory infections in children, which is the primary cause of death each year for more than four million children aged 5 years and below.39/

Other examples of women's environmental health hazards related to indoor air pollution include the following:

a. chronic obstructive lung disease -- In 1990, approximately one-third of all women over 50 years old in a rural region of Kashmir were diagnosed with chronic obstructive lung disease. Very few of these women smoked cigarettes.40/

b. chronic bronchitis and cor pulmonale -- The main cause of these medical conditions in women in Nepal is cooking fumes, not tobacco smoke.41/ The association of these diseases and domestic cooking and heating fumes has been made in other parts of India and Papua New Guinea.42/

c. lung cancer -- A 1990 study reports a ten times increased risk of lung cancer in women who use coal stoves for cooking and do not smoke cigarettes, compared to women who use gas for cooking and do not smoke cigarettes.43/

d. adenocarcinoma -- Coal burning, indoor smog pollution in winter and low ceiling height, not cigarette smoking or environmental tobacco smoke, were found in a study to be the main risk factors for adenocarcinoma for women in Harbin, China.44/

V. Degradation of Water And Related Health Effects

Water is needed in households for personal hygiene, sanitation, waste disposal, child care, crop growing and food processing, yet supplies commonly are inadequate and unsanitary. Only 25 per cent of people in urban areas have access to an in-house or courtyard source.45/ This limited access forces women and children to spend eight or more hours every day fetching polluted water from supplies that become increasingly distant because of drought.46/ This significant time demand takes away from the time women spend on child care or food production and preparation. In fact, it has been determined that the nutritional level of children is often negatively related to the distance the mother must walk for water.47/ Poorer women who spend more time on income-earning activities have less time for water collection and often have to accept water of lower quality, which threatens their health and welfare.48/

Approximately 80 per cent of all sickness and diseases in developing countries can be attributed to inadequate water supply and sanitation;49/ waterborne infectious diseases affect more people in developing countries than any other health problem.50/ These diseases include cholera, typhoid and infectious hepatitis and other water-related diseases such as malaria and yellow fever.

In developing countries where women are the primary water gatherers, they are particularly susceptible to contracting a waterborne infectious disease because of their frequent contact with and presence around water. In India where women are primarily responsible for fetching water, 30 per cent of their mortality and 50 per cent of their morbidity is due to infectious waterborne diseases.51/ It is estimated that 90 per cent of all child deaths in India could be avoided by safe water and sanitation.52/

With increased development, the contamination of surface water and groundwater in developing countries has also increased. Surface water is contaminated by sewage and chemical pollution from industrial toxic wastes. In developing countries, 95 per cent of urban sewage is discharged into surface waters without treatment.53/ Exposure to bacteria, parasites and viruses from raw sewage in water supplies results in a more serious public health threat than exposure to toxic contaminants in developing countries.54/ This is especially true for children who develop diarrhoea from bacterial, viral and parasitic infection contracted through water, food and contact with fecal matter. Diarrheal diseases alone kill between five and six million children each year and is the leading cause of death among children in developing countries.55/

Exposure to industrial chemical pollution also seriously affects the health of women and children in developing countries. Marine organisms consume heavy metals and synthetic organic chemicals that accumulate along the food chain in predatory fish. Mercury in contaminated seafood ingested by pregnant women has been linked to cerebral palsy in infants 56/ and exposure in utero to polychlorinated biphenyls from pregnant women eating fish from contaminated waters are associated with poorer short-term memory **functioning** in childhood on a dose-response basis.57/

Groundwater is contaminated most commonly by pesticides and fertilizers used in agricultural processes. This contamination poses environmental health threats by depleting the availability of already scarce water supplies and presents a particular threat to infants who can develop a life-threatening blood condition from ingesting water contaminated with nitrates from fertilizers.58/

VI. Conclusions

The health of women in developing countries is an essential factor to include in the planning and implementation of successful sustainable development programs. Their health is compromised by their poverty and by the degradation of environmental resources such as soil, forests and water. And although they are the primary natural resource managers and perform two-thirds of the world's labor, they often have been excluded from the planning and execution of development programs that directly affect their lives and their health.

This paper has discussed how the poverty and malnutrition of women in developing countries dramatically affects their health and makes them and their children more susceptible to disease. In addition, the degradation of the environment from soil erosion, deforestation and contaminated water supplies further challenges their health status. Women should be involved in the early planning stages of sustainable development programs so that their concerns, needs, abilities and opinions can be integrated in the program's design. Only with their involvement will a development program truly succeed, as they are its most reliable, vital and precious resource.

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Increasing the Role of Women in Environmental Decision Making and Management

(Agenda item 7(c) of the Provisional Agenda)

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I. INTRODUCTION

Women's active role as managers of the earth's natural resources has been widely recognized. What has too long been lacking is the link between their environment-related actions at the community level and their ability to influence environmental policies and project design and implementation.

This paper addresses the need for a closer examination of that linkage and suggests some of the ways it can be approached.

II. WOMEN'S RELATIONSHIP TO THE ENVIRONMENT

a. Environment and Development

In June 1992, the United Nations Conference on Environment and Development (UNCED) convened in Rio de Janeiro, Brazil. The largest international gathering of its kind to date, UNCED drew the world's attention to the need to revitalize economic growth and development while bringing about, at the same time, fundamental changes in decision-making processes at all levels and in all sectors in order to ensure the integration of environment and development at the policy, planning and implementation levels.

Economic growth and development are seen as the key to raising living standards and improving education and health of the world's citizens. Yet, economic development strategies and growth patterns have greatly increased the range and severity of pollution problems and environmental degradation in both developed and developing countries. This has led some policy makers to view environment and development issues in terms of a tradeoff between economic growth and environmental protection. Under this view, regulatory measures and other efforts to protect the environment are seen as a hindrance to economic growth.

Over the past two decades, however, there has been a perceptible shift in development thinking away from the idea that better environmental quality necessarily means less economic growth and vice versa, towards the notion that environment and development are, in fact, interdependent and can be mutually supportive. This concept is often expressed in the term "sustainable development", which implies that growth can be both economically and environmentally tenable.

In examining ways to integrate environment and development objectives at the policy, planning and implementation levels, it is especially important to recognize the role which women can play.

In developing countries, especially, women have a close relationship with nature. Women gather products from the trees and the forest for fuel, food and fodder, collect water and control its use. It is often women who are the repositories of knowledge about the location, reliability and quality of local water and other resources. They have knowledge of traditional seed varieties and tree uses, and can provide valuable information for the development of improved technologies. Faced with resource scarcity, and having to provide for their families, they are acutely sensitive to the need for conservation. They have demonstrated their ability to translate this resource consciousness into action at the community level for environmental preservation and protection.

Traditionally, women have also had a much closer involvement in nurturing succeeding generations. Moreover, it has been suggested that women tend to be more intuitive and "are generally better at understanding second order consequences,"1/, such as are often present in environment/development trade-offs.

Every effort should be made, therefore, to incorporate women's experience, skills and contribution into all aspects of policy design, programmming and implementation.

The need tó ensure the full integration of women's contribution to sustainable development was acknowledged by UNCED in its recognition that societies cannot successfully achieve the complex goal of environmentally sound and sustainable development unless they call on the capacities of all their citizens, including the largely untapped resource of women.

b. Environment, Development and Women

While there is widespread acknowledgment of the relationship between environmental degradation and conditions of poverty, the critical linkage between environment, development and women is less well recognized.

Many of today's environmental challenges stem directly from low levels of development and conditions of poverty. For example, in conditions of poverty, people have little recourse but to cultivate marginal lands and to overexploit resources, although this may lead to widespread overcultivation and deforestation. This, in turn, produces rising incidence of droughts, floods and extinction of animal and plant species.

Other examples of the link between poverty and environmental degradation abound. Those with low incomes tend to have less access to safe water. Indoor air pollution, caused by smoke and fumes from using biomass fuel for cooking and heating, results in exposing poorer citizens, mainly women and children, to respiratory illnesses.

Where poverty is a factor in underdevelopment, it is often women and children who are the most seriously affected. A majority of the world's poor inhabit rural areas, where they are largely landless, unskilled, underemployed or unemployed, and lacking in adequate food and sanitary conditions. Most of these are women and children. In addition, in many parts of the developing world, nearly one third to one half of all households are headed by women.2/

In developed and developing countries alike, women, and the children for whom they are responsible, tend to be poorer than men and to have less access to resources and opportunities.3/

Women's daily arduous tasks in many parts of the world, such as collection of fuelwood, fetching of water, growing and marketing of food, have direct impact on the environment. As women perform these tasks in direct connection with the environment, a vicious cycle is often in operation. Responding to the immediate need for family survival, yet lacking appropriate technology and credit, women, despite their respect for the natural environment, are sometimes forced into unsound farming practices which further degrade their environment. The vicious cycle worsens when increasing environmental deterioration of the natural resources upon which the women depend results in further negative consequences on their daily lives. For example, rising rates of deforestation leading to increased shortage of fuelwood means that women must travel farther and farther in search of fuelwood.

Depletion of environmental resources in the rural community, the loss of arable land, and the drying up of streams, etc. has resulted in increasing numbers of rural poor moving to cities in search of better conditions.

Unfortunately, women in urban settings often fare no better. Their living conditions are frequently as poor, marked by pollution caused by industrial wastes, lack of safe drinking water, and improper sewage.

Women's activities in these urban centres, whether in the household, the informal sector or in low paying wage employment, are equally vital to family survival.

In general, women play a major role as cultivators and environmental managers in their own societies, yet often receive little recognition or support for this role. Expanded opportunities for more productive roles for women in both rural and urban settings will have important positive benefits for their societies as a whole.

III. WOMEN'S ROLE AS MANAGERS OF THE ENVIRONMENT

a. Women as resource managers

As noted earlier, it is widely recognized that women throughout the world play a crucial role in the management of natural resources. As managers of households, farmers, stockbreeders and suppliers of food, fodder, water and fuel, they interact intimately with their environment.

Women manage a wide range of activities connected to the natural resources on which their lives depend. They play important roles in farming, agricultural management, food processing, and protection of family health. In many parts of the world, women are responsible for passing along environmentally sound methods of agriculture, based on their extensive knowledge of cropping practices and traditional seed and plant varieties. There is also ample evidence to suggest that women have been especially conscious of the importance of protecting the natural environment and conserving resources.

Women are often the principal growers of food. It has been estimated that they grow at least 50 percent of the world's food and as much as 80 percent in some African countries.4/
It is also most notably women who grow the food crops essential for survival in periods of economic stress. 5/

Nonetheless, "women farmers work longer hours, have fewer assets and lower incomes than men farmers ..." 6/

A major reason why women farmers are poorer is because they have less access to credit, skills training and agricultural extension services. Without credit, they are unable to attain the cattle, fertilizer, or improved seed varieties which would enable them to increase their cultivation and improve their productivity. Despite this fact, it is often women who pass on ecologically sound methods of agriculture based on their knowledge and experience with traditional crop systems.

Women also have a key role in the planting and cultivation of trees. It has been observed that this is partly "because they are in charge of home gardens where trees are often grown and in part because the task of tree planting and nurturing has few economic returns. Because women are used to working without immediate payment in cash or in kind, they cope better with the delayed nature of returns on investment implicit in tree planting and protection." 7/ It is thus not surprising to find that women are increasingly taking part in attempts to reverse the destruction of forests, through such efforts, for example, as the Greenbelt Movement in Kenya, and, in India, the Chipko Andolan Movement.

In addition to the above, women perform many tasks related to protecting the family's health, treating many common illnesses and injuries at home and performing health work in the community by learning and transmitting new health technologies to others.

Women are equally engaged in large numbers in the informal sectors of the economy, functioning as market vendors, food peddlers and artisans, where they generally receive low pay and little economic security. It has been noted that "people who work in the informal sector usually do not abide by or have to contravene municipal regulations (such as business permits) to operate. They also rarely have access to credit, skills training or technical assistance that could make their work more productive and remunerative." 8/

The contributions which women have made to development in their societies is all the more striking when one considers how little recognition these contributions have been given to date. Despite the fact that their labor is largely unpaid and often uncounted in any traditional measure of economic development, women are nonetheless major producers of value and managers of resources in their respective countries. As such, they have an important stake in the decisions and practices which directly affect the environment.

Greater recognition of and support for the largely unheralded role of women as environmental managers is needed. Further, women ought to receive the types of financial and other assistance which will enable them to continue and expand upon their role in more productive and beneficial ways. This would help to ensure more efficient use of their time and wider opportunities to participate in the planning and decision making which affects them and their families.

b. Women as Decision Makers and Policy Managers

At the same time that women's actual contributions as resource managers at the local level are grossly ignored or undercounted, women's potential at the managerial and policy making level remains largely unrealized. As a result, despite their essential role as managers of their environment, women's perspectives are largely omitted from macro-level and community decision-making processes which affect environmental outcomes.

Studies have shown that the number of women in management, especially in top management, in the both public and private sector remains low in all parts of the world. For example, in the Philippines, although "women accounted for approximately a third of the labor force by 1976, only 2.7 per cent of the working women held administrative or managerial positions in government or business, a figure representing less than one percent of the total managerial positions. 9/

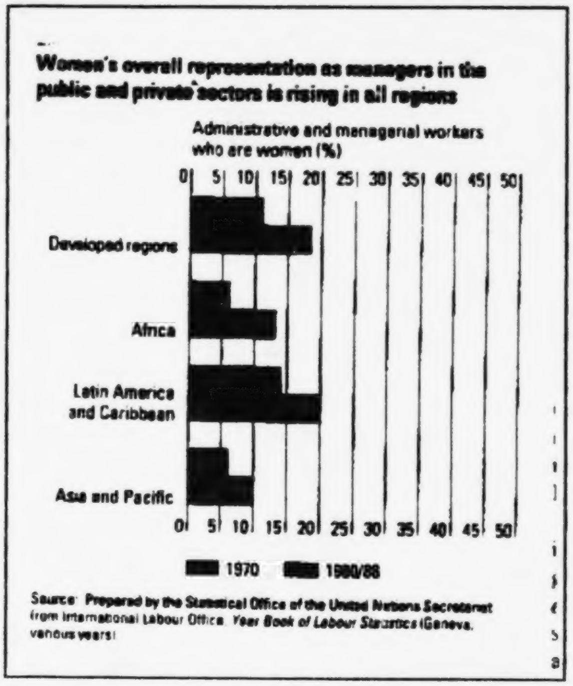
Even in countries where the numbers of women in administrative and managerial positions have been increasing, or where progressive attitudes about women's roles tend to exist, the number of women at senior managerial levels remains relatively few.

> "Though Sweden is often described as a progressive exception to the patterns of sexual discrimination that prevail in other countries, Swedish women, in 1973, were being paid on average, 20 per cent less than men.., an indication that women continued to hold lower-level positions. Throughout the last decade, Swedish women have rarely been found "in authority over men particularly men of the same age and education. Women...{have been} underrepresented in trade unions, in Parliament and in managerial positions in both public and private enterprise" 10/

A recent United Nations study revealed that women are grossly underrepresented in economic decision-making. Although significant gains have been made since 1970, the study pointed out that

> "Administrative and managerial workers - including legislative officials, government administrators and managers - make up an elite of 2 to 3 per cent of all workers...The Latin American and Caribbean region had the highest proportion of women in these administrative and managerial jobs in the 1980s, at about 20 per cent. That proportion averaged 18 per cent in the developed regions, 13 per cent in Africa and 10 per cent in Asia and the Pacific."11/

WOMEN'S OVERALL REPRESENTATION AS MANAGERS IN THE PUBLIC AND PRIVATE SECTORS



Women's overall representation as managers in the public and private sectors is rising in all regions

Source: Prepared by the Statistical Office of the United Nations Secretariat from International Labour Office, *Year Book of Labour Statistics* (Geneva, various years)

Source: The World's Women 1970-1990, Trends and Statistics, United Nations, New York, 1991

IV. INCREASING THE ROLE OF WOMEN IN ENVIRONMENTAL DECISION MAKING AND MANAGEMENT

a. Need to integrate women into environmental decision-making

In view of the linkages between environment, development and women which have been outlined above, it seems clear that more attention needs to be focussed on increasing the number of women decision-makers, planners, managers and technical advisers.

Experience has shown that development initiatives which do not take into account women's needs and roles tend to be less successful than those which do. A recent study which examined the relationship between overall project success and the level of women's participation found that "when women's participation was high, project success was high, and when women's participation was low, project success tended to be moderate or low." While the study makes no claims about the causality of this, it did point out that "the failure to reach women was generally symptomatic of the failure to consider the project's target group and the dynamics of the local system." 12/

There is growing recognition that for sustainable development strategies to succeed they must involve the active participation of the intended beneficiaries. It has been demonstrated that strategies to achieve environmentally sound and sustainable development (adequate food, clean water, unpolluted air, basic education and health care, etc.), necessitate working directly with the affected communities, with the poor and with women who are responsible for household management, and for management of water, fuel, waste disposal, and food production.

In environmental administration, discussions are underway concerning the potential value of decentralization of decision-making and resource allocation as critical means to expanding services and improving service delivery. Greater emphasis is also being placed upon the need for intersectoral coordination, for harmonization between central and local levels, and for working with local groups, non-governmental and grassroots organizations. Women's groups have shown initiative and have become increasingly effective in taking up responsibility and lobbying for environmental policies that affect their communities' interests. Paying greater attention to these vertical and horizontal linkages is likely to involve more women in decision-making as women are currently clustered at lower levels and in non-governmental sectors.

For all of these reasons, it is imperative that women be given equal access to resources and to opportunities for decision making affecting sustainable development.

b. Critical linkage between Women as Resource Managers and Women as Decision Makers and Policy Managers

In view of the close relationship between women and environment, it is important to devise strategies for increasing the number of women involved in policy making for sustainable development.

The majority of those affected by environmental decision-making remain the poor, the rural, and the women operating at the grassroots and community level. Nonetheless, there is also a critical role to be played by women at the policy-making level.

As noted above, however, few women are currently engaged in decision-making on a policy level. Women in public administration work mainly at the lowest levels. Efforts to integrate women as decision-makers and beneficiaries of environmental policies remains weak without strong pressure from constituencies. Until the numbers of women in senior management are sufficient to form a critical mass to influence environmental policy decisions, women's participation in ecosystem management and sustainable development will remain limited.

It is necessary that both the greater numbers of women operating as resource managers at the grassroots level and the smaller, but potentially influential, numbers of women operating at the policy level recognize the crucial link which exists between them. The complementarity of their roles must be more clearly understood, maintained and strengthened.

As has been noted earlier, women, through their daily routines, relate directly to environmental issues. They have become successful leaders in a variety of community groups and non-governmental organizations, designing and participating in projects and programmes for enhancement of the environment. They have demonstrated, through various grassroots movements, their organizational skills and their capacity to effect positive change, by engaging their local communities in income generating and resource renewing activities. They must be further encouraged, through credit, technical assistance and governmental support.

Local government authorities, likewise, play an important role in the implementation of national environmental policies, establishment of local environmental policies and regulations and oversight of local planning processes. Experience has demonstrated that direct participation of the principal beneficiaries is criticial to the success of most development schemes. Local authorities, therefore, must enter into dialogue with the citizens, local organizations and women's groups, drawing them into the conceptualization of environmental programmes which affect their local resources.

Women operating at the policy level can serve as supporters of the women who are undertaking local level initiatives. Women in management can provide the linkage between local community and women's groups and government policies regarding allocation of resources and devolution of responsiblities for environmental programmes. They can be advocates for financing infrastructure for local self-help environmental initiatives. They can provide a voice at central decision making authorities when decisions are taken which impact directly on the lives of women in rural communities.

For this linkage to be truly effective, however, it must be clear to the women in the local community that the women in policy making roles are able to understand their needs, have their interests in mind, and will support their initiatives. At the same time, women who succeed in attaining positions at the policy level must not seek merely to emulate traditional male managers. Rather, they must opt to retain their special skills as women, drawing upon their close connection to the environment.

There are reasons why this potentially powerful linkage between women resource managers and women policy managers has not been fully realized to date.

In the first place, women who have managed to gain access to managerial positions up to the present appear often to have been those who are born into the "right" family, socio-economic class, tribe or ethnic group.13/ Often, women who succeed in holding influential positions in political and economic life are those from prominent families. In most instances, influence from their rare positions of power has not seemed to trickle down to affect the lives of the most disadvantaged which, as stated earlier, includes mainly rural, grassroots women with limited access to formal education. Local women may be skeptical, therefore, that women in the policy making arena will take positions which favor their needs. Secondly, as has been noted elsewhere, the relatively few women in managerial roles means that their potential to effect critical change is minimal. Their ability to serve as links to the local community is hamstrung by the lack of a critical mass of senior managerial women. Support from local women's constituencies could serve to strengthen the position of these women managers.

These observations raise two important questions: why are there so few women in a position to make decisions relating to sustainable development and how can these numbers be increased?

V. BARRIERS AND CONSTRAINTS TO INCREASING WOMEN'S PARTICIPATION IN ENVIRONMENTALLY SOUND AND SUSTAINABLE DEVELOPMENT

> "Women constitute 41% of the world's workers but hold less than 10 to 20% of the managerial and administrative jobs... Their representation in the highest circles of government is less than 10%. Last year, only three countries had more than 20% women at the ministerial level."14/

Women face many barriers and constraints in their efforts to increase access to decision making and to ensure that policy decisions adequately reflect women's perspective. These barriers and constraints are of both a structural and a psychological nature.

Case studies presented at a recent seminar in Ljubljana, for example, demonstrate that women have stricter selection criteria, must work harder to obtain appointments and promotions and have relatively less job security. 15/

Of course, the barriers and constraints to women's full participation in sustainable development vary in relative weight or importance, based on cultural and socio-political conditions. Some of these include:

a. Cultural patterns

In many societies, women's role is dictated by the traditional division of labor between men and women. In this scenario, women's responsibilities are considered to be centered around the household and the rearing of family, while the public domain is left strictly to the men.

This presumption results in both overt and covert signs of discrimination in the workplace and in society at large. For example, when women do work outside the home, the dual demands placed on them by work and family results in women being largely employed in low-skilled and low income jobs or in the informal sector. In many cases, women employed as agricultural workers, for instance, are mainly hired as temporary unskilled workers while permanent jobs are reserved for men. In other cases, women are not hired in their own right but only as part of a family team subject to contracts agreed with the man as head of the family. Often, women are required to seek their husband's permission to work.

When women do succeed in entering the formal economy, these traditional stereotypes of women's role tends to place them on separate career paths, discriminated against in wages, promotions, and retirement. These cultural barriers can also cause men to be resistant to supervision by women, making it difficult for women to rise to supervisory and management levels.

Women's perceptions of themselves can also be influenced by traditional stereotypes. In some situations, women still see employment as a temporary stage before marriage and childbirth. This pattern of thinking has been identified as a factor in the failure of women to aspire to and men to perceive of higher career aspirations for women.

b. Legal Structure and Economic Conditions

In many societies, the law discriminates against women. As a result, they often have no legal status without assistance from their husbands, and find it difficult to own land, obtain credit, open businesses or bank accounts. Women are sometimes given the right to produce food on the land, but control over the land is vested in the male head of household. Inheritance laws sometimes prevent women from inheriting land from their relatives. Even where laws have been introduced to give rights to women, local customs can sometimes contradict the law. In Zimbabwe, for example, a law was passed allowing women to own property, yet in rural areas, tradition still reserves the ownership for a women's father or son. 16/

Evidence suggests that in urban areas as well, women experience discrimination with regard to the right to property. A recent study indicates that women suffer disproportionately from the diminishing availability of low-cost land, and in squatter settlements, women's legal status is often ill-defined. Furthermore, statutory land allocation tends to favour male-headed households.17/

There are many economic constraints as well on women's participation in sustainable development. Because women's agricultural labor is often needed to produce for the family's subsistence, women have less access to producing cash crops. Women are often financially dependent upon their husbands. Because women face difficulty in obtaining access to credit, they are denied access to technology, tools, equipment and fertilizers. They are also denied access to technical assistance and to down payments for housing.

In the public sector, there is often an absence of legislation prohibiting discrimination against women in wages and training.

c. Lack of Education/Training

In 1985, only 51 per cent of women could read, as against 72 per cent of men. 18/ Tradition holds it more important to educate male children, partly because it is believed that it is men who will be gainfully employed. Some parents even fear that educating their daughters may hurt their prospects for marriage.

Women have also not been given the same access to higher education or to other forms of training. Women's education in business and management, while, on the increase, does not yet equal that of men. Moreover, women are less frequently trained for careers in scientific and technical fields.

Women's disadvantage in access to education and training is sometimes exacerbated by inability to pursue or complete training courses due to heavy responsibilities in the home.

d. Lack of Experience Considered as Qualifications for Decision-Making Positions

As has been noted earlier, women have major experience as heads of households,in community work and as managers of natural resources prior to entering the labor force. Yet, this experience is seldom counted as real experience when evaluating women's potential for decision-making positions.

As a result, women who do enter the work force tend to be found in female-dominated bureaucracies, such as social services and education, where they are likely to remain clustered in the lower ranks.

With limited acccess even to middle management positions, it is difficult for women to reach higher levels of decision making and management. Women who succeed in rising through the ranks often complain of encountering a "glass ceiling," a level beyond which few women rise.

VII. STRATEGIES FOR INCREASING WOMEN'S PARTICIPTION IN ENVIRONMENTALLY SOUND AND SUSTAINABLE DEVELOPMENT

There are a number of strategies for increasing women's participation in policy and decision making in order to ensure that women's perspectives are more systematically included in environmental management initiatives, and to increase the possibility of effecting needed changes in the system. Quite naturally, different strategies will have different time frames. For example, gaining greater access to higher education and training in technical fields is of a longer term perspective to make a difference than strategies designed to admit women to managerial roles based on less traditional kinds of experience.

Moreover, the possibilities for increasing the representation and impact of women in decision making and management and the selection of potentially more effective strategies to bring about such change depends fundamentally on the socio-economic conditions of each society and the culture's perception of the dominant constraints. Effective strategies should seek to address the need to increase both the numbers of women in policy making and managerial positions as well as their level of influence.

International aid agencies and other donors can assist with some of these strategies through a combination of financial, technical, educational and informational resources. Care must be taken, however, to ensure that women participate in the design of the projects and are not only involved in their implementation or merely expected to be beneficiaries.

ASSESSMENT OF WOMEN'S IMPACT ON ENVIRONMENTAL MANAGEMENT

Research on participation of women and men in the formulation, implementation and evaluation of environmental projects. Through the production and analysis of case studies at country level, the project will determine factors that affect successful environmental projects, and in particular determine the conditions for and the benefits of including women in all stages and aspects of environmental management. The project would involve training in gender-sensitive research, development and analysis of case studies, and a seminar to assess the lessons learned from these case studies.

Although there are many opportunities for women's input into decision-making in environmental management, governments have not always organized their policy-making machinery in a way to encourage women's participation nor have governments taken responsibility for preparing women for decision-making roles. Due to the historical and current responsibilities which women exercise in the use and conservation of resources such as water, energy and various health-related policies, input from women both at policy development and continuous management stages is critical. One must examine both the openness and focus of decision-making processes, as well as the readiness of women to participate.

Concerning the readiness of women to participate, one must examine education systems, in particular, access to science and technology subjects, as well as access to scholarships, and internships. Continuous education and in-service training to upgrade skills of women is also important, as is sensitivity training for senior goverment officials involved in public personnel policy making. Also significant is the need for training of women in management skills traditionally neglected during their formal and informal education.

Environmental managers and administrators must also have multidisciplinary skills. Training should include assistance in understanding and defining alternative policy options, and methodologies for incorporating environmental considerations into planning processes. 19/

TRAINING FOR ENVIRONMENTAL MANAGERS AND ADMINISTRATORS

Short term training programmes should be aimed at middle and senior managers in government whose input is required to transform technically sound solutions into implementable policies and programmes. Training programmes should be focused and relatively brief so that officials can realistically expect to be released from duty to attend the programmes. The type of training needed is defined by the capabilities required by each agency, but might include: government policy; institutional and intersectoral coordination; information for policy-makers; basic skills in critical interpretation of environmental data presentations; environmental impact assessment; risk assessment; and scientific and technical subjects.

Women must also have access to proper career progression, in diverse and increasingly responsible positions. Organizations must reduce gender bias in determining rotation, travel, mobility and performance evaluation. They must also increase gender sensitivity in career advancement and be supportive of the special needs of women in integrating their work and family roles. Greater recognition and credit must be given for experience attained outside the public and private sectors. For example, managerial experience in voluntary organizations and in running households must be acknowledged. The intersection between the scientific/technical and the managerial is especially significant for women who are likely to work in societies in which the accepted mode of behavior for women is to be a help-mate or assistant, not a decision-maker. Strategies must be designed explicitly to overcome gender-bias in women's career advancement.

WOMEN'S ACCESS TO CAREERS IN SCIENCE AND TECHNOLOGY

Research, training and consultancy activities to increase women's access to science and technology training and careers in the environmental field, through determining factors that affect women's access to science and technology careers and women's consequent ability to contribute to environmental policy and management, and design ways of increasing women's participation therein. Project activities might involve training in gender-sensitive research, leading to review of statistics, policies and programmes, as well as the role of professional organizations and the development of case studies.

Policy decision-making systems are often closed or limited to an exclusive group of professionals or politicians. Such systems often exclude women. In the environmental management area, this exclusion is particularly serious. Not only must young girls be trained to be scientists, administrators and politicians, and women curently holding these roles be brought into the decision-making arenas, but also these systems must be opened up for more popular participation, which could and/or should include more women.

Women as producers and consumers of resources have first-hand knowledge of serious environmental consequences and wastage of resources. A closed decision-making system will exclude important perspectives. A new and complex policy area such as the environment must be especially open to as much input as possible.

Due to their somewhat passive position in many societies, women are more likely to be shy about presenting their ideas, and especially when a subject is presented as highly

POLICY DIALOGUE/CONFERENCE ON WOMEN AND THE ENVIRONMENT

A policy dialogue held in a conference format for up to 200 participants would promote linkage between local level women resource managers and top level women policy-makers, leading to improved environmental policy and implementation. The outputs would include the conference, materials prepared as inputs, a report which would present analysis of the issues and proposals for improved policy development and implementation, as well as associated training in gender-sensitive policy-making. This dialogue process could be supported by annual conferences and a secretariat in a related ministry.

scientific. Thus, the framing of the issue, as well as the location of the discussion could exclude women's input. These behavioral issues could pertain to educated women as well as the uneducated. Thus, policy systems must be designed, at least initially, to positively include women.

PROMOTING WOMEN AS CONSULTANTS ON ENVIRONMENTAL ISSUES

Development and implementation of a programme to encourage women to establish small business ventures in the field of consulting on environmental issues, thereby developing national capacity for gender-sensitive environmental analysis. Research would lead to the development of a package of incentives for promotion of private sector environmental consulting firms, which would be reviewed by a conference of potential women entrepreneurs from scientific, business and policy communities.

In some parts of the developing world, institutionalized quota systems have been introduced as one means to raise the number of women in public life. In other cases, policies which address the need for day care and flexible working schedules for either parent are also being tried.

Mass media can be used also as an effective tool for increasing women's awareness of their potential roles, increasing self confidence and changing public opinion and perceptions.

VII. CONCLUSION

The United Nations Conference on Environment and Development was, in some sense at least, the culmination of two decades of increasing recognition of the necessity of incorporating environmental considerations into development policies. In yet another sense, however, UNCED marks a beginning more so than an end. It has pointed the way towards strengthening the role of many non traditional groups in society which are needed to ensure sustainable development in the 1990s and beyond. One key priority in this connection is to ensure the advancement of women's role in achieving environmentally sound and sustainable development.

In order for sustainable development to be a reality, women must be given an equal opportunity to participate as a full development partner, to make choices and to influence societal choices.

Poverty has been an overarching factor exacerbating the problems of women and their children and further accelerating environmental deterioration. Therefore, poverty alleviation and investment in women's education and health are critical .

Environmental programmes which emphasize the participation of women as environmental managers and which take cognizance of their skills and knowledge of traditional conservation methods will be especially useful. In other words, women will need to exercise decision making authority and be involved at all levels of policy making, programme design and implementation.

Women in local communities and women in managerial positions must recognize the complementarity of their roles and be supportive of policies designed to strengthen each other's inputs.

More research is needed on women's roles and status and the interrelationships between women's status, environment and development. Better understanding is also needed of gender distribution of tasks and gender roles in decision-making, as variables in understanding community response to environmental management.

Emphasis needs to be placed on increasing the access of women to education and to all forms of training, of both short-term and medium term duration, with particular attention to enhancing women's knowledge of managerial techniques and processes and their understanding of technical, legal and scientific subjects of particular importance to environmental management.

Finally, despite their considerable burden in managing the environment, women must not be looked on as merely victims or even solely as intended beneficiaries of sustainable development programmes. The time has come to acknowledge their right to full partnership in decision making for sustainable development and their integral role in environmental management programme design and implementation.

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Environmentally Sound and Sustainable Development:
The Case for Women in Small-scale Mining

(Agenda item 9(a) of the Provisional Agenda)

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Introduction

Mining is the extraction of metallic and non-metallic minerals from the earth for the human necessities of life and comfort. In many developing countries mining is a major contributor to the economy and a major source of export income. In many cases, the benefits are derived in the form of taxes and royalties, paid to the host government from large-scale, capital-intensive, technically sophisticated and foreign owned mines. However, these type of ventures do little to stimulate national development.

On the other hand, mining activities conducted at a level appropriate to the financial, technical and industrial resources of the country can bring real benefit in general development terms. Small orebodies such as alluvial deposits and high-grade deposits give rise to small-scale, labor-intensive mining ventures which, with appropriate government support and improved technical efficiency, can contribute to the national economy, support a significant segment of the population, and serve as a stepping stone to medium size enterprises.

Small-scale mining is one area of the mineral industry where women participate and where greater opportunities can be available to them by enlarging and upgrading this participation. However, to offer this opportunity, small-scale mining itself must be developed in an environmentally sound and sustainable manner.

What is small-scale mining?

Small-scale mining is difficult to define. The range and amount of useful minerals worldwide make it difficult to give a universal definition. Attempts have been made using parameters as: the number of people employed, size of the concession or mining areas, size of reserves or economic minerals, production capacity, degree of mechanization or capitalization, life of the operations and others. There is no doubt, though, that small scale mining is an important economic activity, as old and important as agriculture. For example, of the estimated gross value of the 138 billion dollars output of non-fuel minerals production in 1982, small-scale mining was responsible for 16 percent, or 22 billion dollars.

We can characterize small-scale mining as a producer of limited amounts of minerals from deposits with few known ore reserves, usually not amenable to mass or large scale mining, where extraction is achieved with limited use of mechanical energy and through extensive use of labor. All types of metallic and non-metallic mineral resources can be mined at this scale, but certain mineral resources are especially amenable to small operators. For example, precious metals (gold, silver), placer deposits (tin gold, platinum), pegmatites (rare earths, mica, tungsten), and industrial or non-metallic minerals. Most come from surface or near surface deposits, have very little waste or overburden or cover, use uncomplicated metallurgy and usually are easily accessible.

Distribution and sale of the minerals commonly involves government agencies which treat the raw ore and commercialize the metal content, by large companies, by private buyers of gold and gemstones, or by illegal buyers. Metal products mostly enter the world market and industrial minerals are often processed and consumed locally.

Artisanal mining or the most basic mining is characterized by little or no use of mechanical energy, by exploitation of hand labor, carried out with leadership usually lacking technical, managerial and business skills. This can lead to serious wastage of non-renewable resources by high grading or extraction of only the richest part of the ore. In many parts of the world, especially in rural areas, it is a seasonal alternative to starvation.

The majority of these small mines are worked by one or two people, or by families or small groups, through various forms of leasing or by sharing the output with the owners of the mineral rights, by joint ventures, and through cooperatives.

Advantages and disadvantages of small-scale mining

What are the advantages and disadvantages of small-scale mining?

Small-scale mining provides a practical way to open up remote areas and initiate a money economy. Small deposits are opened or developed much more rapidly than larger deposits and at a fraction of the investment. The cost of production will not be substantially greater than that of a major operation.

It can form the basis for local processing and manufacturing industries, either on a small scale or as feeders to larger centralized plants. Examples include the artisanal cutting of and polishing of gemstones, splitting of micas, use of clays for bricks and ceramics, of silica sand for glass, and of gypsum for cement. Small mining avoids many of the major problems that plague large-scale mining in developing countries such as high financing, complicated infrastructure, large consumption of energy, and acquisition and application of imported technology and expertise. As a labor-intensive activity, small mining operations employ large numbers of workers, generally in areas remote from cities. It is a training ground for young professionals and technicians and for new entrepreneurs. The extent of small mining worldwide has lead to the recognition or discovery of major deposits; many large mines had their origin in small workings.

The drawbacks, especially in artisanal mining, are that it is a brutalizing business, often characterized by vicious exploitation of labor, less-than -subsistence wages, appalling working conditions, and disregard for health and safety. Small-scale mining often leads to splitting of large orebodies, where scores of owners work parts of the deposit at different times, rates and elevations, which results in an uncoordinated, extremely wasteful, irrational exploitation. These orebodies will not attract capital for their exploitation and cease to be economically viable assets. This is particularly true with placers that dump waste material on adjacent reserves, thus reducing them to submarginal properties.

The problems of controlling and regulating small mining industries can be immense. Where gems and precious metals are mined, illicit operations are widespread, smuggling is common, and lawlessness prevails. Monitoring of operations is difficult, and governments receive less revenues in terms of licensing fees and taxes. There are problems in providing necessary financing, encouraging efficient processing and developing linkages to manufacturing and satisfactory marketing arrangements. The inability of Government to control small mining results in the reluctance of the local private sector to invest in small operations. Funds to support field inspectors, to encourage research, improve local expertise, or promote private investment are consequently lacking.

Environmental impact of small-scale mining

One activity must be continuously addressed: the environmental impact produced by small-scale mining. Mining is an activity where results are very visible as to its effects on the areas where it takes place. This is true for surface and underground mining and for the complete cycle from exploitation to processing. It is interesting to note that back in 1556, in one of the first mining textbooks - De Re Metallica -, environmental effects on German forests were mentioned and mining defended on terms very similar to the ones cited today. The problem is therefore very old and the same balance between environment and sustainable development is being sought.

Environmental problems from uncontrolled mining affect the ground and soils, affect drainage systems, deprave forests and contaminate the air. In surface mining, areas have to be cleared of vegetation for the pits, waste dumps and required infrastructure-roads, buildings, processing plants, repair shops,etc; topsoil is stockpiled for subsequent restoration of the ground and hazards are limited to dust and control of drainage and storm water. Less land clearance is needed for underground mining infrastructure such as shafts and dumps, but surface subsidence can occur.

Processing is the more potentially hazardous operation. In artisanal small-scale gold mining, the use of mercury for amalgamation of gold affects rivers where washing of ore is done, affects the air when it is burned off to recover the metal and of course affects human and other living creatures. Use of other reagents will produce toxic liquors which have similar effects. Mercury has a relatively low price and is easy to use; this makes it attractive to small miners. It is provided by the illegal gold buyers as an incentive for mining.

Small-scale mining as well as environment in general is now the focus of concern by all nations, and proposed studies and measures for the control of detrimental procedures are being requested from the United Nations. The United Nations Revolving Fund for Natural Resources Exploration (UNRFNRE) has prepared environmental protection guidelines for its own exploration programmes and as information to incipient governments about possible environmental, social, and cultural consequences caused by development of mineral projects. The purpose of these guidelines is to change the often widely-held belief that environmental management is incompatible with industrial development. At the International Roundtable on Mining and the Environment, held June 1991 in Berlin, guidelines for environmental control were proposed. The former Centre for Transnational Corporations, now part of the United Nations Department of Economic and Social Development (UNDESD), calls for greater attention to the impact of company operations on the environment in host nations, and to the integration of environment and development goals into all corporate programmes . Transnational corporations are being encouraged to play a greater role in the better management of the environment.

Additionally, UNDESD has prepared an action plan for Environmental Management and Sustainable Development. Its strategy is to integrate the work of several sectoral specialties within a framework of overall environmental commitment. It covers five areas: development planning for policy and economic analysis; public administration for training of government officials; public finance and taxation to encourage or discourage actions; environmental statistics and monitoring to produce data for rational decisions, and population issues with its relationship to environment. The framework will be used for all areas of work of the Department namely energy, water, mining and infrastructure. One of the major aims of the Department is "the inclusion of women in programmes, plans and activities for sustainable development and environmental protection."

In the Mineral Resources Branch of UNDESD, we are addressing environmental concerns. We have assisted Colombia by providing a consultancy to analyze placer mining and its environmental implications in the Bajo Cauca Antioquena. For fragile island environments, in Jamaica, the concerns and constraints associate with non-metallic mining and quarrying were addressed and guidelines for environment protection were given. In the Dominican Republic we were called upon to review and prepare guidelines for an environment study for the transition of mining oxide ores to mining sulphide ores at the

Pueblo Viejo gold mine to protect the delicate island environment of that country. Similar guidelines are being provided for the nickel laterite mining and processing operations at Moa Bay, Cuba. Paraguay is asking for assistance to study the use of peat as a soil conditioner, in relation to erosion from deforestation which may greatly affect the gigantic Itaupu Hydroelectric plant and dam on the border with Brazil.

One major parameter not to be forgotten is the cost that environmental measures add to mining. The feasibility of mining, especially small-scale mining which cannot meet these costs, can be greatly affected or not take place at all, because of added costs. In the 1960s, environment measures required from the copper mining industry of the United States added 15 cents to the cost of mining, producing a crisis to that industry. A balance must therefore be struck between economic and environmental needs.

The Importance of Sustainable Development of Small-scale Mining

The Role of the Informal Sector

In Africa and other developing countries, the informal sector plays an essential role as a safety valve and palliative for the social implications of the structural programmes under way. It attracts members of the civil service who can no longer live on low salaries. Many are engaged in the informal sector as a second activity. Through lack of sufficient jobs, graduates in the semi-public sector and young persons with diplomas have to fall back on the informal sector. In the case of mining, the informal sector offers the attraction of gold and precious metals mining. As noted previously, in rural areas, many women are involved in this activity, because of financial crisis.

The development of the informal sector has risks and disadvantages. The workers in the informal sector suffer from marginality and vulnerability in their employment when in the long run the development of a country's human resources depends in improved working conditions and increased wage levels. In the case of the State, there is a decrease in tax assessment which leads to surtaxing of the visible operations and enterprises in the modern sector in order to maintain its capacity to finance the infrastructure necessary for development of the country. Taken all round, the informal sector does not present an adequate industrial fabric through lack of permanence, scope and compliance with minimum operating rules. Hence the challenge is gradually to incorporate this sector into a more structured whole while not destroying its motive power.

Need for Sustainable Development of Small-Scale Mining

A number of developing countries, especially in Africa, are in the process of structural adjustment programmes, one of the aims being to cut down the share of public and semi-public sectors in their economies. The private enterprise is now being called to replace the State and take over from public and semi-public sectors in order to revive growth and create jobs.

The private sector is having difficulties in fulfilling this role. In many countries, private sectors suffer from the existence of numerous regulations which obstruct free enterprise and tend to upset the operation of the markets (fixing and control of prices, gross profits, wages and salaries, interest and exchange rates). Enterprises spend a great deal of time complying with unduly restraining administrative formalities; meanwhile, the informal sector manages not to abide by regulation. In both cases, the regulatory framework reinforces the bureaucracy.

Investment codes are frequently detrimental to local modern enterprises of small and medium size. They favor larger investments and new arrivals on the market through preferential tax treatment for new arrivals (exemption from customs duty and company taxes) that put local companies at a disadvantage to compete. Weakness or absence of a capital market is a drag in development of enterprises. They must rely on self-financing or on credit which in the case of the informal sector, is made available at exorbitant rates. Difficulties of the banking sector in a number of countries make the financial status of enterprises more vulnerable.

Access to strong foreign exchange is more difficult for private enterprise especially where sale by auction has been established. State guarantees accorded explicitly to public enterprises are not available to private enterprise, which is a disadvantage to them in dealing with suppliers and financiers.

Enterprises are usually under-capitalized; operating funds do not meet operating needs, and produce self-financing margins that are too low. They have difficulties in ensuring a continuous supply of inputs, and face problems of maintenance and modernization of production tools. They do not have access to technologies most suited to their activity or have difficulty in procuring them. They are very sensitive to the current state of the market they are involved in.

Nevertheless, in spite of these multiple difficulties, the small and medium-size enterprise sectors must be strongly supported. Small-scale mining, well carried out, offers the opportunity to start enterprises, open to all, which can develop into medium size entrepreneurships. In view of the decline of the semi-public sector, this is the best chance for setting up a structured industrial fabric essential for sustained development and from which women can greatly benefit.

The Role of Women in Sustainable Development

The Role of Women in the Informal Sector

The United Nations has recently published a report that includes an analysis of the informal sector. The report states that the informal sector represents one wedge of opportunity for women - the opportunity of self-employment. Crucial to the survival strategies of many women, the informal sector also opens up important long-term opportunities where salaried employment is closed, declining or inadequate for women. Women work in the informal sector because of necessity and convenience, because it requires less skill and education, and has fewer biases in favor of men. And it is easier to reconcile with cultural norms that keep women near the home, for there is less conflict between working hours and household tasks. But informal employment is a far less secure employer than the formal workplace, and productivity is often low.

Income may be lower in the informal sector for several reasons. One is the absence or high cost of credit. Another is lack of government support. A third is exploitation by larger firms controlling raw materials or markets. And although women's participation in the informal sector is increasing, the returns are declining. Despite the meager earnings, the informal sector has been women's only recourse for surviving the economic crisis in Africa and Latin America.

In 1990, urban women outnumbered rural women by a ration of about 3:1 in developed countries and in Latin America and the Caribbean. By far the largest number of rural women today are in Africa and Asia. Urban growth also places stress on women left in rural areas. The migration of men leaves them with total responsibility for themselves and their dependents, and it leaves them with fewer resources to meet these responsibilities especially where the land has been depleted. Male and female migration to the cities leaves many elderly people behind, most of them women and most of them with very few resources. (One of the gold cooperatives visited in Costa Rica consisted of eight elderly people, men and women, who had to turn to that activity to survive.)

With regard to the environment, the report states that women are direct consumers of basic natural resources in developing countries because they are the basic providers of household water, food, fuel for cooking and heating. In developing regions women and girls have a greater role in subsistence agriculture than men. But women rarely have a say in major decisions and practices directly affecting their environment and their resources needs. Many development projects exploit raw materials for export. These activities ignore long term effects on natural resources and the people who depend on those resources. Women and their families have been deeply affected by projects that have depleted the resource bases on which many of their productive activities depend. Programmes aimed at protecting the environment have also ignored women's needs and their exposure to pollution. Women are more susceptible environmental pollutants because of their child bearing role. Planners are now recognizing women's intuitive knowledge of the environment and have begun to address their concerns for environmental protection.

Where Are Women Involved in Small-Scale Mining?

Numerous examples of women participating in mining activities have been reported. Unfortunately there are no statistics detailing the number of women involved. Usually they are simply included in the category of informal miners with no breakdown of the information. No international agency has compiled information on the matter. Recognizing that small-scale mining is an opportunity area for women, the United Nations Fund for Women (UNIFEM) has begun a small study to try to get an idea of the extent of women's participation in mining in developing countries.

In industrialized countries and more developed countries, women in mining activities participate as geologists and engineers, as technicians in laboratories, in clerical work, in some cases as entrepreneurs, and sometimes even as miners. In the United States, women work in coal mines in Kentucky and West Virginia, and can be found as miners in large underground mines such as the Henderson Mine in Colorado. In the large copper mines of the southwestern part of the United States, women work as truck drivers and in other categories.

On the other hand, we find small mines which are at or near the artisanal level with little technical input and little use of equipment. These are found mainly but not entirely in developing countries. In artisanal or informal levels there are numerous women and family groups who work in areas where the location or nature of the deposit makes hand labor the only practical way to extract the minerals especially those that have a special added attraction value such as precious metals and diamonds. Artisanal miners are usually local people trying to improve their lives by seasonal work as most of the activities are in rural areas where they have small farms or plots of land.

Bonanzas have always attracted miners including women. One example is Nambija in Ecuador where women and even children can be found looking or scavenging for gold nuggets. Also in Ecuador there is considerable activity near the border with Colombia at the Tobar Donoso, Camumbi, and San Juan areas where there are eight to ten areas mined by informal miners including women. Many cross from the Colombian border to the mine. A recent article in the New York Times reports on the Muzo and Quipama emerald mines, 50 miles north of Bogota, Colombia where guaqueros or prospectors mine for precious stones. Among these are children as young as 6 years old who are members of families spending seven days a week scavenging for emeralds. In Costa Rica, at Peninsula Osa, in the southern part of the country, there are five cooperatives where women are members and work side by side with men. In Bolivia there are the traditional "palliris" or women that scavenge the waste dumps hand sorting and selecting small enriched material that has been discarded or not included during the mining process. In small or artisanal mines in Bolivia, mined by family groups, the woman also acts as the administrator leaving the man free to work the extraction of the ores. In Africa, in Ghana, women work in diamond mining and are very vocal in having the pits filled in so that agricultural ground is restored. In Zimbabwe, there are many women involved in small-scale mining. Here, also, there is an Association of Women in Mining that has 160 members. In India, at Orissa, women work as transporters of ore, carrying material in baskets, to processing areas for the recovery of gemstones. In China, women have good participation as indicated in page 10 of the document on Chinese Case Studies, presented at this workshop.

The Future Role of Women in Small-Scale Mining

Small-scale mining can offer an opportunity to women in roles as entrepreneurs, professionals, or leaders and guiders of their groups or cooperatives. Small scale mining has opportunities for everybody. For this the right conditions must be strengthened by governments and international institutions such as the United Nations. UNDESD will host a seminar in Zimbabwe in early 1993 to produce guidelines for the development of Small and Medium Scale mining enterprises. Similarly, for environment, it will cooperate with UNEP in a workshop on environment and mining to be held in Zambia next year, and another with CDG and the German government to be held in Namibia, in September 1993.

The United Nations report already cited concludes that it is more important than ever to ensure that women receive training in commerce, management, science and technology to take advantage of changing employment opportunities. In Africa, Latin America and the Caribbean, women's opportunity for wage employment did not improve. Excluded from wage employment, women are increasingly involved in work in the informal sector.

To upgrade this participation, UNDESD has proposed model projects for which financing is required. These include some to promote entrepreneurial development in small-scale mining as models in other countries. Others aim to strengthen the participation of women to develop the experience and to play a more effective role in mining and environmental control.

Conclusion

There are many examples of assistance to small-scale mining, but there are always difficulties in obtaining the financing to carry them out. They are all necessary to elicit the confidence of the mining groups and to encourage development. Small-scale mining is the basis from which much of the medium scale mining and even major mining is derived. It provides an opportunity for entrepreneurship for all social groups, and should be encouraged and supported.

Recommendations

It is recommended that funding be provided to develop one or more of the project profiles to assist women through mining in the alleviation of poverty, through training as entrepreneurs and administrators, and through increased productivity, to increase their income for their benefit and that of their families.

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Women and Water-related Environmentally Sound, Sustainable Development: Translating Policies and Concepts into Action

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I. INTRODUCTION

At the recently completed International Conference on Water and the Environment, held in Dublin, Ireland, from 26 to 31 January 1992, attention was focused on the development, utilization and management of water resouces in harmony with environmental conservation and the concept of sustainability.

The concept of sustainability recognizes the interrelationship between water and other natural resources development as well as between management of freshwater resouces and sustainability of economic development. Freshwater ecosystems are stressed by human activities to promote socio-economic development which often produce adverse effects on human health and the development itself. To achieve long term, sustainable development, such adverse environmental effects must be avoided. This requires the adoption of new approaches to the development and management of freshwater resources, recognizing the central role played by women in the provision, management and safeguarding of water.

The United Nations General Assembly, by Resolution 42/187 (December 1987), urged the adoption of sustainable and environmentally sound development patterns. It recognizes the fact that it is impossible to separate socio-economic development issues from environmental ones; some development strategies can seriously harm the environmental resource base, and environmental degradation in turn can undermine development prospects.

The General Assembly by Resolution 45/181, endorses the four guiding principles as enunciated in the New Delhi Statement (adopted at the Global Consultation held in New Delhi, 10-14 September 1989), pertaining to the need to protect environment and health, the need for institutional reforms, including the full participation of women, the need to adopt sound financial practices and appropriate technologies.

Recognizing an urgent need to translate the concepts into action, the former United Nations Department of Technical Cooperation for Development (UNDTCD) had launched in October 1990, an Action Plan for Environmentally Sound Development through Technical Cooperation which had served as a basis for considering environment and sustainable development as an integral part of the Department's developmental and technical cooperation efforts. In keeping with its established policy on enhancing the role of women in development, the Department had also established in 1982, a Task Force on Women in Development to ensure that programmes in which UNDTCD provided technical assistance to developing countries would reflect women's concerns fully, in accordance with their national development plans. Since its establishment in March 1992, the United Nations Department of Economic and Social Development (UNDESD) has maintained the above policy and continued its efforts in this direction.

Efforts to minimize environmental impacts from sectoral development (agriculture, industry, water, energy, etc.) must be linked to national economic and social development policies. Hence, all sectors involved in water-related development works (agriculture, industry, government, individuals, interest groups particularly women's groups, etc.) must play their respective roles actively in order to achieve environmentally sound and sustainable development.

One of the main problems facing policy and decision makers today is the apparent conflict between environmental and economic interests. Thus, difficulties in adopting strategies to minimize environmental impacts are expected to continue until the environment is being seen and taken as the indispensable foundation for the long-term economic and social growth.

The United Nations Conference on Environment and Development, held in Rio de Janeiro from 3 to 14 June 1992, adopted a set of principles for environmentally sound development, one of which states that "the right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations". Yet another principle states that "women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development".

The present paper emphasizes the need for sustainability and environmental soundness in all water resources development and management projects. Then, citing the inextricability of the interrelationships between women's participation, water resources development, environmental protection, and sustainable socio-economic development, it stresses the importance of integrated water resources management as a basic principle to be adopted to achieve overall sustained development. After discussing several potential advantages that could be gained by the increased role and participation of women, the paper provides an analytical overview of the current status of women's role and participation in water-related sustainable development based on the information contained in country papers presented at the Global Assembly of Women held in Maimi from 4 to 8 November 1991. It also provides some methodological approaches and strategies for the systematic integration of women and women's interests in water resources development programmes and projects for sustainable development. The paper also presents some examples of potential programmes/projects aimed at enhancing the role and involvement of women towards achieving environmentally-sound and sustainable development, with the end in view of providing ideas for the generation of specific, readily marketable programmes/projects during the Workshop.

It should however be borne in mind that the promotion of development projects/programmes to increase women's involvement should not in any way be taken to imply the exclusion of men from such activities. In fact, men should be included in these activities as the main target group from which to solicit support. The United Nations Conferences on Women held in Mexico, 1975, Copenhagen, 1980, and Nairobi, 1985, have all stressed that focus on women does not mean exclusion of men (1). Therefore, in all projects women and men must work together, recognizing their local institutional and cultural constraints to improve the quality of their lives.

II. THE NEED FOR SUSTAINABILITY

The concept of sustainable development has now been widely accepted as the most rational approach that ensures sustained development in the long run without depriving future generations of the same quality and abundance of earth's natural resources and its environment that mankind is enjoying today. The concept requires that the potential, or carrying capacity, of resources be examined first and, only after that, proceed with development plans that also consider the minimization of adverse environment impacts.

One of the main principles adopted by the United Nations Conference on Environment and Development in Rio is that "in order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it."

Water is a renewable but finite natural resource. For instance, groundwater aquifers are periodically replenished by precipitation and by surface water percolating down through the soils. The degree of replenishment or recharge depends on the climate, vegetation and geology of a given region. In humid areas with porous soils, over 25 per cent of annual rainfall may recharge the groundwater system while in desert regions, the recharge may be insignificant or non-existent. Although groundwater is a renewable resource in most parts of the world, few aquifers can withstand enormous extraction rates indefinitely. To ensure adequate groundwater supplies for future generations, the philosophy of sustainable development dictates that groundwater extraction from a given aquifer should not exceed the recharge. Overexploitation of groundwater generally results in adverse long-term impacts affecting future availability and access to groundwater (lowering of water tables, depletion of aquifers, etc.) and environmental degradation (damaged ecosystems, salt-water intrusion, land subsidence, etc).

World groundwater resources are potentially enormous, but excessive exploitation and overpumping have led to a lowering of the watertable in many irrigation areas, which, in turn, has led to salinization and land subsidence(2).

In many developing countries, the steadily growing demand for water by various sectors of the national economy is an issue of particular concern. Although most developing countries generally seemed to have ample water resources to meet the rising demands for water of agriculture, industry and other users, the quantity of water available was often not adequate in the place where it was needed, nor at the time of the greatest demand. Strong competition, both between users and regions, would inevitably arise over the allocation of valuable water resources. Moreover, with growing water use, the increase of pollutants released into water bodies was effectively diminishing the amount of usable water in many developing countries. As a result, considerable difficulties in water supply and in the protecting of water from pollution would be experienced in many areas. Consequently, there is an urgent need for intensification of the efforts towards water-related environmentally sound and sustainable development.

In developing countries, integration of environmental issues in water resources management is often only in a starting phase and less information exists on the dimension of the problems and their adverse effects on the potential for sustainable development. Pollution and over-exploitation of groundwater aquifers is widespread and threatens socio-economic development.

Janusz Kindler, in his paper "Water - the Environmental and Developmental Dimensions - Striking a Balance", presented at the International Conference on Water and the Environment (ICWE), Dublin, 26-31 January 1992, stressed that mankind today must restore degraded ecosystems and bring water resources to such a state that they can maintain themselves naturally. He urged water resources planners and managers to think in terms of sustainable development in using and managing water resources, the natural environment and the landscapes in such a way as to maintain a strong economy and preserve the natural environment today and for the years to come (3).

The need for environmentally-sound and sustainable management of water resources is imperative, because: (i) cleaning up contaminated water resources is a costly and sometimes impossible task. A preventive strategy is always preferable to a remedial action; (ii) the availability and quality of freshwater is intimately linked to broader environmental concerns.

III. INEXTRICABLE RELATIONSHIP BETWEEN WATER AND OTHER FACTORS FOR SUSTAINABLE DEVELOPMENT

A. WATER AND SUSTAINABLE DEVELOPMENT

Water plays a major role in socio-economic development. During the last decade there has been a growing realization that problems of fresh water availability and quantity are linked to broader environmental concerns and therefore should not be viewed independently. At present, there is a strong perception that most aspects of economic development are dependent on reliable water resources.

Food and energy production and many other activities are intimately linked to a safe, reliable and affordable water supply. Judicious management of this precious resource is central to the success of global strategies for sustainable development.

Water management activities such as irrigation, played a central role in the development of early civilizations. In some developing countries, water-related diseases are a major problem in areas with low and variable rainfall, while in others, loss of life and damage to property from flooding are a major problem in areas of abundant rainfall and in low-lying coastal areas.

The interaction between water and socio-economic development is not limited to the impacts of water on development. Many socio-economic development activities also modify the quality and flow characteristics of water resources and reduce their capability to serve human needs (4).

1. Water and social development

Provision of water supply for drinking, personal hygiene, and other domestic purposes, contributes to social development through the improvement of health, sanitation and other living conditions.

As domestic water supply functions as an element of socio-economic infrastructure, its adequate availability is a crucial factor in community stability that can affect the success of many other components of development.

2. Water and economic development

The use of water for agricultural purposes is one of the basic applications for economic development. Irrigation is necessary in many areas where rainfall is inadequate. It is also needed in areas where rainfall is adequate to increase production under conditions of extreme weather variation. Water's role to improve agriculture is important not only because of the key role of nutrition to improve health and welfare but also because of the major role played by agriculture in many developing economies.

Water is a necessary input for industrial production. Its application in industry includes fulfilling the domestic needs of industrial employees, and as a raw material for production and for cooling. Industries possess substantial flexibility with regard to their water consumption and reuse while producing the same product in same quantities.

Hydroelectric energy production is an important industrial application of water. Electricity is an input into most productive activities as well as a direct component of human welfare when used as a consumer good. Inadequate supply can serve as a significant obstacle in achieving industrialization, expansion in agricultural output, and other basic development objectives. The role of water in power production is most direct in hydroelectric power generation, but water also plays a significant role in steam-electric generation, primarily as a cooling medium.

Cooling is a major purpose of water withdrawal in many developed countries. As in the case of other industrial water uses, quantities of water needed for cooling purposes can be dramatically reduced. Reductions generally require recycling.

Water's role in transportation also represents a significant contribution to economy. Transportation systems are a major component of economic infrastructure with potential impacts on various economic activities.

Water also contributes to the production of goods and services through natural productive processes. For example, naturally occurring fisheries directly satisfy a large portion of the nutritional needs of many peoples and support substantial sportfishing and commercial fishing operations.

Finally, natural bodies of water has been used as a medium for waste disposal. Natural water bodies dilute wasewater and in the case of some contaminants, provide natural treatment through such processes as decompositin of organic substances. But increasing volumes of wastewater and development and use of chemical substances, not subject to natural decomposition, have resulted in major water quality problems that endanger human health and adversely affect aquatic organisms.

3. Land/water resources use and rural development

Sustainable development requires conservation and protection of land and water resources. In reviewing the interrelationship between resource conservation and the needs of the rural poor, the World Commission on Environment and Development (WCED) suggested a potential lasting solution: "Pressure on resources increases when people lack alternatives. Development policies must widen people's options for earning a sustainable livelihood, particularly for resource-poor households and in areas under ecological stress".

An integrated development programme involving conjunctive management of land and water resources to help the rural poor could contribute to environmentally sound and sustainable development. For such programmes to be successful the involvement of rural communities is crucial, particularly women and women's groups.

Efforts to integrate land/water resources use and rural development should encourage and motivate target communities such as rural poor and women groups to provide insights into appropriate resources management options. Local poeple, including women, have detailed knowledge of the ecosystems and ways of using them in a sustainable manner.

B. RELATIONSHIP BETWEEN WATER AND OTHER DEVELOPMENT FACTORS

The role of water in socio-economic development cannot be isolated and defined independently of other development factors, as the role of water is closely associated with other complimentary factors. The availability of adequate supply of water in the absence of other complimentary factors is not a sufficient conditon to ensure development. For example, provision of irrigation water without appropriate farming practices may fail to produce anticipated increases in crop production.

The specific roles of water in development will vary among individual situations; land, climate, rainfall, etc. The existing level of development will also influence the role of water. For example, expansion of agricultural and industrial water supply may produce a greater impact on developing economies and the preservation of natural water environments may produce a greater impact on developed economies.

The inevitable interrelationships among various factors in development dictate that the interdependence of these factors be fully considered to achieve sustainable development.

Although some factors may pose a major constraint on development, efforts to concentrate on these factors alone to the exclusion of others cannot be expected to produce optimum results towards sustainable development.

In view of the inextricable relationship between water and other sectors an integrated approach to water resources development management becomes necessary in order to achieve sustainability and environmental soundness.

There are two main reasons why the coordination of water resources management with other sectors of the economy should be strengthened: (i) Water managers should be able to assess, and charge for, the full costs of water resources management involved in sectoral and overall economic development plans. If the ability to pay is low, subsidies could be applied, but preferably not through reduced prices for water services; (ii) Agencies in charge of, or responsible for, individual economic sectors should be instrumental in the implementation of integrated water resources management plans.

IV. INTEGRATED WATER RESOURCES MANAGEMENT FOR SUSTAINABLE DEVELOPMENT

A. THE NEED FOR INTEGRATED APPROACH TO ACHIEVE SUSTAINABILITY

Integrated water resources development and management as an instrument for sustainable development requires consideration of the economic, social, environment and legal aspects of development in an integrated manner.

Integrated water planning and management, based on a comprehensive ecosystem assessment, taking full account of the use of water in human activities should therefore be the main principle behind the environmentally sound, sustainable development and management of water resources. Human use of the environment is an essential part of every day life and is an essential component in development. Integrated planning and management of water resources must therefore take full consideration of the use and potential benefits of environmental processes in human activities and must manage activities and resources with due consideration of environmental protection for sustainable development.

The characteristics of effective integrated water resources planning were defined by A.S. Goodman and K.A. Edwards as follows(5):

"The term water resources planning refers to planning for projects, programmes, or policies that involve:

- a single-purpose, single-unit plan to meet a demand for water, solve a problem caused by water, take advantage of an opportunity for water development, or preserve and enhance water and related land resources;
- a multi-purpose and/or multi-unit plan;
- a regional plan for water resources development, preservation, or enhancement, staged over a period of time with one or more planning horizons; and
- a national plan for water resources development, preservation, or enhancement.

The term integrated water resources planning takes account of the preceding and, in addition, assumes proper attention to the:

- legal and institutional, and budgetary and other constraints;
- planning objectives at national, regional and local levels;
- physical interrelationships among the units of a water resources plan;
- supporting infrastructure that is needed to secure the products and services of a plan, their distribution to beneficiaries, and the benefits and costs of the plan;
- identification of all appropriate alternatives for development, preservation and enhancement with different contributions to planning objectives and different amounts of products and services;
- possible tradeoffs among objectives, purposes and effects of a plan;

- externalities of the plan;
- effects of the plan including those of an engineering, economic, environmental, social, legal and institutional nature;
- contributions by engineers, economists, biologists and other disciplines related to the plan;
- contributions by agencies representing all economic sectors affecting or affected by the plan;
- involvement of individuals affected by or interested in the plan; and
- method of presenting the features and expected results of the plan so that it can be commented upon by all interested parties and assessed and acted upon by decision-makers.

Finally, effective integrated water resources planning refers to the derivation of a plan, while paying proper attention to the foregoing, that is optimal to society."

In developing countries, this is usually achieved through the setting-up of a national master water plan, which provides a framework for the planning of individual water development schemes and ensuring the optimization of economic and social benefits while minimizing adverse environmental impacts as a result of thorough analysis and study of tradeoffs between economic and social benefits as well as environmental impacts.

The use of systems analysis techniques in setting-up national master water plans helps to find solutions that can achieve optimum social and economic benefits while observing a series of conditions and limitations required for achieving environmental protection and sustainable development.

Most water uses, such as public water supply, agriculture, industry, navigation, recreation and mining, represent different sectors of the economy, managed through corresponding responsible ministries and agencies. National, regional or sectoral development plans generally assume that water is available at low costs or even free. Consequently, little attention is paid to an efficient use of water, or - more generally - to an efficient use of natural resources.

The concept of water as a free common good must be reassessed and given a proper economic value, safeguarding the needs of the poor. Such an approach requires the establishment of a balance between economic, social, technical, organizational, managerial and legal measures and skills. Institutional frameworks should be decentralized in support of self-sustaining and socially relevant programmes, which include community involvement, with emphasis on the role of women. A participatory process, leading towards integrated water management must be enhanced and encouraged. To achieve this, a high priority must be given to human resource development and institution-building and strengthening. The new emphasis on human resource development should be expanded to train users with community-planned, developed and operated schemes, taking into account social, cultural or economic groups in water use, particularly women groups.

Far-reaching measures must also be taken to preserve the quality of water bodies and the physical integrity of aquatic ecosystems. New approaches, such as integrated pollution control, involving air, land and water, should be developed as a matter of urgency. Rational management of transboundary freshwater resources is another imperative, requiring increased cooperation among countries sharing more than 200 international river basins in the world. Agreements should apply to rivers, lakes or groundwater, and should include the protection of the quality of receiving marine waters. Protection of the aquatic environment is of paramount importance for preserving life on earth.

B. APPLICATION OF EFFECTIVE INTEGRATED WATER MANAGEMENT TECHNIQUES

Integrated water resources planning should have two principal goals: (i) to plan environmentally sound programmes and projects that are economically efficient and socially desirable, and (ii) to execute projects that will be sustainable over a long period of time, irrespective of the continued availability of external financial or technical assistance.

Appropriate administrative organizations and good leadership within these organizations are very important in water resources planning and management. Adequate manpower, manpower training, organizational powers, and removal of legal impediments, are needed for effective exertion of leadership. Mechanisms must be developed for proper coordination of the national, sectoral, and project organizations involved in planning, and for other organizations and individuals involved in or interested in water resources planning.

C. STEPS TO BE TAKEN TO ENSURE THE INTEGRATED CHARACTER OF WATER MANAGEMENT

The Dublin Conference recommended four main guiding principles that need to be applied in taking action to achieve integrated water resources development and management (6). These four guiding principles are:

"*Principle No. 1*:Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment. Since water sustains all life forms, sustainable management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems. Effective management links land and water uses across the whole of a river basin or groundwater aquifer.

Principle No. 2: Water Development and Management should be based on a participatory approach, involving users, planners and policy-makers at all levels. The participatory approach involves raising awareness of the importance of water among policy-makers and the general public. It means that decisions are taken at the lowest appropriate level, with full public consultation and involvement of users in the planning and implementing of water projects.

Principle No. 3: Women play a central part in the provision, management and safeguarding of water. This pivotal role of women as water users and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance of this principle requires positive policies to equip and empower women to participate at all levels in water resources programmes.

Principle No. 4: Water has an economic value in all its competing uses, and should be recognized as an economic good. Within this principle, it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources."

The strategies, programmes/projects aimed at promoting women's involvement in water-related sustainable development which have been formulated in the following chapters are based on the third guiding principle.

A commitment to integrated management must usually arise through legislation, planning or regulation to be put into effective action. Integrated water resources planning and management may be achieved through close cooperation between existing institutions or a new institution may be established to perform basin-wide integrated management. In any event, integration will require the best use of the resource compatible with development objectives, harmonization of methodologies and analysis, good communication and intersectoral cooperation.

The main components for the establishment of integrated water resources planning and management are: First, political credibility and commitment must exist, producing a basis for policy harmonization, administrative authority and conflict resolution. Second, organizational structures must be established with defined boundaries of responsibility, compatible objectives and the capacity for flexibility and change in the light of evaluation of progress. Third, processes and mechanisms for integrated management are needed, covering planning, pollution control, economic evaluation and enforcement. Last, organizational culture and participant attitudes must support integrated management, ranging from ministerial support, through interagency communication to staff training and recruitment policies.

Government ministries in both developed and developing countries traditonally focus on productive growth of the economic sectors they represent. Utilisation of natural resources for sustainable development is not an issue that fits into that structure. Environmentally sustainable development requires coordinated decision making on planning and implementation issues.

This problem may be solved through an institutional arrangement in which coordinated decision making can be implemented.

V. WOMEN'S ROLE AND CONTRIBUTION TO ACHIEVING SUSTAINABILITY AND ENVIRONMENTAL SOUNDNESS

1. Roles that can be played by women in sustainable water development

The goal of UNCED is to achieve sustainable development through the integration of environment and development goals. However, it has been recognized that without the integration of environment and women's concerns into development decisions, sustainable development will not occur.

Recently, there has been an increasing awareness of the specific role that women could play in the process of promoting social and economic development, and in the management of water and other natural resources. Women, who are the providers of basic family needs including water, food and fuel, are the first to be affected by the burden of inappropriate environmental management and related problems of water quality, food scarcity, and deteriorating living conditions. Women's reproductive role is an additional aspect which specifically links women and the environment.

Women are often more susceptible to deteriorating environmental conditions and tend to be among those primarily affected by the deterioration of the quality of ground and surface water. Reduced rainfall and increased erosion from deforestation has also decreased the availability of water and soil for family food production, which is an important task of women in most rural areas. Consequently, preservation of water sources and of the environment is increasingly an area in which development objectives and women's concerns should go hand in hand.

Women should be considered not only as beneficiary or target groups, but also as active agents who can contribute to generating ideas in policy, mobilizing labour, providing resources, and disseminating and implementing innovations. For example, by involving women in the planning and management (including operation and maintenance) of water and sanitation projects, the sustainability of these projects can be enhanced.

Women represent a noteworthy potential for environmental management and resource enhancement. Inspite of the importance of women's involvement in environmental protection and development, their role and extent of participation in the process of planning and management of water resources are far from reaching desired levels. This indicates an urgent need to reconsider development strategies and activities in order to benefit from the participation of women in water development planning and environmental and resource management.

It should be noted that there is no single rule or model for integrating women into planning and management of water projects, which is suitable for all situations. Different approaches need to be developed for involving women according to different situations, namely, a society where women are actively involved in economic production, a society where men's and women's tasks differ and areas of responsibilities and contacts are strictly divided, a society where women have no immediately visible role in decision-making, and a society where there is a large number of female-headed households. To ensure positive results from increased participation of women in sustainable water development, women should be encouraged to undertake the kind of tasks which they are used to undertake in their respective traditions and cultures. Some of the culturally appropriate tasks for women in developing countries include: management of local water supply systems; arrangement of local financing of project development and/or project maintenance; fund collection, fund management, accounting and auditing; training of women trainers; water point maintenance and repair; management and dissemination of information; and organizing public education and awareness campaigns.

In general, the type of society to which to adapt the forms and means of women's participation, decides the specific roles in which women's participation will render most effective and useful. The effectiveness of women's participation in water development projects is affected by the size of the project, the nature of intervention and the level of participation. Experience of completed projects in some developing countries indicated that women's participation has been most effective for small village level projects, in the rural milieu.

2. Potential advantages of women's involvement in water-related sustainable development

In countries where women are responsible for getting water for use by the family, reduction of water-carrying distances often resulted in the increased productivity of in agriculture and family income as well as improvement in family hygiene and associated health conditions. In the long run this will ultimately lead to poverty alleviation and higher living standards.

Promotion of the role of women in water-related sustainable development projects as producers, innovators, and income earners may also contribute to protecting the environment over the long run through reductions in fertility and, consequently, population growth.

Other advantages to be gained by promoting women's involvement in sustainable water development projects are:

(i)Increased support for the materialization of the project

As the main beneficiaries of water development projects, women have the greatest felt need for improved water supply facilities, and therefore are greatly motivated to support such projects. Women groups are also very effective in soliciting community support and participation as well as mobilizing funds to initiate the project.

(ii)Physical contributions

In addition to their support for the projects, women often physically contribute to planning, installation/construction, maintenance and management of projects.

(iii)Increased access to information on local conditions and practices

In designing a project to bring maximum benefits to the target group, a detailed knowledge of local needs, conditions, difficulties and practices is necessary. Women, by their involvement, could lend their practical knowledge on local conditions and practices as well as the environmental, socio-cultural and economic reasons underlying them.

(iv)Lower construction and maintenance costs

Engagement of local women and women groups in projects as managers and workers can significantly cut down administrative overhead costs and labour costs.

(v)Improved and enhanced utilization of project facilities

Participation of women in all phases of development ensures that the new facilities are designed to suit their requirements and preferences resulting in enhanced utilization.

(vi)Improved sustainability of projects

As women are the main users of water, maintenance and operation of the facilities by themselves result in improved sustainability of projects.

VI. AN OVERVIEW OF THE PROGRESS MADE IN PROMOTING WOMEN'S ROLE AND PARTICIPATION IN WATER-RELATED SUSTAINABLE DEVELOPMENT

An overview of the current status of women's role and participation in water-related sustainable development is based on the success stories presented by country participants at the Global Assembly of Women held in Maimi from 4 to 8 November 1991. The stories deal with particular problems towards which specific activities initiated or participated by women are addressed and the resulting outcome of those activities. The stories provide a global perspective as the experiences cover 30 countries from Africa, Asia and the Pacific, Europe, Latin America and the Caribbean, and North America. They also provide an indication of the nature and type of tasks which women feel themselves to be most capable of undertaking under various geographical, social, economic and cultural backgrounds.

The themes of success stories, names of presenters and the countries which they represent are given in Annex 1. The problems addressed by each success story, activities undertaken by women and the ensuing results are summarised in Annex 2.

An analysis of the information contained in annexes 1 and 2 permits an assessment of the existing status of women's role with regard to the specific fields of water-related development in which their initiative or involvement has been proved to be effective or most useful; the nature of tasks or activities in which women have interest and shown their competence; and the nature and extent of benefits that women's active involvement could bring, consistent with the objectives of environmentally sound and sustainable development.

1. Fields of water-related development in which women's involvement is most useful

A study of the problems to which women's initiatives and activities are addressed in presentations by country participants suggests that their contributions have been most useful and effective in the specialized fields of water supply, sanitation, environmental protection, water pollution control, water conservation, fishery, institutional building, training, and launching publicity and awareness campaigns. A breakdown of the number of success stories presented by region as well as by field of specialization is given in Table 1.

In Africa, six countries presented 8 success stories in the field of water supply (Kenya 2, Lesotho 1, Rwanda 1, Senegal 1, South Africa 1, and Zimbabwe 2); one country (Nigeria) presented a success story on environmental protection; one country (Kenya) on fishery improvement; one country (Botswana) on sanitation; and one country (Kenya) on water conservation. It will be noted that Kenya has made considerable progress in promoting women's role and participation in water-related development judging from the number of stories presented and the number of specialized fields being covered. It is therefore a country with potential for transfer of experience and technology in this field to other countries on TCDC (technical cooperation among developing countries) basis, at both regional and interregional levels.

In Asia and the Pacific, five countries presented 6 success stories on water supply (India 1, Indonesia 1, Myanmar 1, Republic of Korea 1, and Viet Nam 2); three countries presented 5 success stories on environmental protection (India 2, Isreal 1, and Thailand 2); one country (China) on water pollution control; two countries on publicity and awareness creation (Indonesia 1 and Nepal 1); one country (Sri Lanka) on institution building; one country (Thailand) on sanitation; and one country (India) on training in the operation and maintenance of hand pumps. As countries in this region have considerable experience on promoting women's role in different fields of specialization, the strength of one country in a specific field may be used to fulfil the deficit of another country through TCDC.

Table 1. Specific fields in water-related development in which women's initiative/participation have been successful
(Number of success stories presented by region as well as by field of specialization)

Specific fields	Africa	Asia & Pacific	Europe	Latin America	North America	Total
1. Water supply	8	6	-	-	-	14
2. Environmental Protection	1	5	2	4	2	14
3. Water pollution control	-	1	1	1	10	13
4. Publicity & awareness	-	2	1	3	-	6
5. Fishery	1	-	-	2	-	3
6. Institution building	-	1	-	1	-	2
7. Sanitation	1	1	-	-	-	2
8. Water conservation	1	-	-	-	-	1
9. Training	-	1	-	1	-	2

In Europe, two countries presented a success story each on environmental protection (Netherlands 1 and USSR 1); one country (Germany) on water pollution control; and another country (USSR) on enhancing awareness of the importance of protecting ecosystems.

In Latin America and the Caribbean, three countries presented four success stories on environmental protection (Argentina 1, Dominican Republic 1, and Honduras 2); one country (Brazil) presented a success story on water pollution control; three countries (Antigua and Barbuda, Argentina, and Brazil) each presented a success story on launching publicity and awareness campaigns; two countries (Mexico and Uruguay) presented a success story each on development and protection of fishery resources respectively; and one country (Mexico) on training for increased community participation in water and sanitation projects.

In North America, one country (United States of America) presented 2 success stories on environmental protection and 10 success stories on water pollution control. Most of the success stories on water pollution control (10 out of 13) come from North America, namely, the United States of America. It indicated two things: the importance attached by that country to water pollution control, and the extensive experience the country has had in the field of women's involvement in protecting water quality.

Finally, it will be observed that most of the developing countries in Africa, Asia and the Pacific, and Latin America and the Caribbean do not have success stories in a very important field of water pollution control. It could therefore be a field in which generic and replicable programmes and projects on enhancing the role and particapation of women may be developed.

2. Nature of tasks and activities in which women had shown interest and competence

The successful activities currently undertaken by women in each specialized field of water-related development are summarised below.

(a) Water supply (development, operation and management)

-Organization of public support to secure access to better sources of water from neighbouring villages;
-Self-help projects on water development and management to improve water availability, income generation and access to basic facilities;
-Water well construction and pumping equipment installation;
-Rainwater harvesting;
-Development and management of water treatment systems;
-Operation, maintenance and repair of water supply infracture including boreholes;
-Water supply pipe network installation; and
-Watershed management for protection and conservation of water sources.

(b) Environmental protection

-Enforcement of environmentally sound management strategy to prevent natural resources depletion or degradation;
-Mobilizing people and communities concerned, through the organization of workshops and training sessions, to influence agricultural development policies causing water pollution and to secure water rights and passage of legislation concerning clean up of affected land and water by industries;
-Mobilizing communities to block dam construction, mining projects, shrimp industry, etc., which threaten soil erosion, water contamination, wild life extinction, and destruction of forests and wet lands, through education and information dissemination;

-Conducting research on potential adverse impacts on water quality of local lakes and reservoirs by planned economic developments, so that concerned public could halt such developments;
-Creating general awareness among people and educating tribal women on environmental health;
-Monitoring of groundwater levels and quality for prevention and mitigation of land subsidence and saline intrusion; and
-Rehabilitation of degraded watershed through integrated farming techniques for the protection of forests and water resources.

(c) Water pollution control

-Research and studies on linkage between pollution of rivers and public health, anaerobic treatment of concentrated organic industrial wastewater, and decontamination of river water by low cost treatment processes;
-Data collection for restoration and protection of water quality;
-Strengthening citizens' involvement in water resources conservation and pollution prevention; and
-Influencing public policy to pass environmental legislation regulating farming practices and industry, prevent pollution of lakes through improved sewage treatment, halt leaching of toxics into water springs and crop lands, mobilize voluntary labour to clean up local creeks of waste material and other pollutants, and create environmental awareness among people concerning presevation of watersheds.

(d) Launching publicity and awareness campaigns

-Organizing awareness campaigns using radio, television, news media, and group demonstrations towards achieving environmentally sound development and management of water resources and better understanding of the dangers of contaminated water to human health; and
-Conducting public lectures based on research and studies concerning ecological equilibrium of ecosystems to impart environmental education and increase public awareness of the importance of protecting nature.

(e) Protecting and/or improving freshwater fisheries

-Helping local women to make rational use of inland water bodies through construction of fish ponds and fish farming; and
-Conducting research, with the participation of local fisherwomen, on the effects of regulating the openening of sand bars to coastal lagoons on the production of shrimp and fish.

(f) Institution building

-Forming women's proups and societies to help women get better access to clean water, fuelwood and medicinal plants; and
-Promoting women's organizations through providing assistance in seeking funds from governments and NGO's and providing training in the application of simple technologies.

(g) Sanitation

-Construction of prototype toilets for demonstration to villagers and impementation of women-focused water and sanitation projects using participatory approach.

(h) Water conservation

-Helping village women conserve scarce water resources through appropriate water management techniques and supplementing existing resources with alternative resources such rainwater.

(i) Education and training

-Organizing training programmes on the operation and maintenance of hand pumps for the benefit of rural women; and
-Helping governmental and non-governmental organizations to train people (with emphasis on women) in the community to organize and administer their own projects.

3. Nature and extent of benefits brought about by women's activities

The benefits resulting from women's activities described above are summarised as improvement in living conditions, improvement of health conditions, increased economic and social benefits, conservation and protection of land and scarce water resources, increased environmental education and technical capabilities of communities, especially women, and increased sustainability of water-related projects and services.

(a) Improvement in living conditions

-Women are relieved of the burden of carrying water over long distances;
-Women now have more time either to engage in productive activities or to engage in social and recreational activities;
-Increased employment opportunities for women bring in increased income for women as well as their families;
-Improved availability of clean water and sanitation results in higher living standards for women and the communities;

-Increased availability of food and better nutrition; and
-Better living environment resulting from increased recreational areas for people with preserved wild life, aquatic life, green forests, clean rivers and lakes.

(b) Improvement in health conditions

-Eradication of waterborne diseases in the communities concerned due to improved quality and quantity water supply and increased number of tiolets; and
-Better community health resulting from increased food production and better nutrition.

(c) Improved economic and social conditions

-Generation of employment for rural population, especially women, means increased opportunities for social and recreational activities;
-Increased agricultural production from the fertility being restored to land, increased fish production from better water quality in rivers and lakes; and
-Enhanced positive attitudes being created towards women's participation in development activities.

(d) Protection and conservation of scarce water resources

-Creation of ample water reserves for use during the dry season; and
-Increased forest areas and cleaner water in rivers resulting from protection or restoration of watersheds.

(e) Strengthened environmental education and increased technical capabilities of women and their communities

-Better education for rural women concerning health care and environmental protection; and
-Acquisition of technical capabilities by women and their communities resulting in self-sufficiency of trained personnel for planning, implementation and mangement of development projects.

(f) Increased sustainability of water-related development projects and services

-Increased environmental sustainability of projects due to aquisition of knowledge and experience concerning the rational use of natural resources including water;
-Increased financial sustainability of projects and services due to increased community participation (particularly women), and increased capability to mobilize financial resources;

-Increased technical sustainability of projects due to enhanced technical capabilities of water users at the village level (mostly women) to plan, develop, operate, maintain and manage the whole water supply infrastructure. For example, better knowledge and experience concerning operation and maintenance of boreholes, handpumps and water supply distribution pipe networks contribute to self sustainability of watersupply projects and services on the long run.

VII. STRATEGIES TO ENHANCE THE ROLE AND PARTICIPATION OF WOMEN IN SUSTAINABLE WATER DEVELOPMENT

To improve the quality of life of the poor in rural areas, it is essential that the role and participation of women in sustainable water development is enhanced. Some of the strategies towards achieving this end are discussed below.

First of all, women should be motivated and encouraged to participate in all water-related sustainable development activities through various educational campaigns and mass media.

Next, for women's participation to be enhanced, it is necessary for governments and cooperating external agencies to adopt a policy of commitment to the involvement of women in development activities, particularly water supply and sanitation activities. To achieve this, it is necessary to create gender awareness among policy makers and politicians through discussions at various meetings, seminars and workshops. In addition, sensitizing men to become aware of the importance of women's role in water-related projects could be useful.

Third, favourable conditions must be created to facilitate women's participation in water development projects by removing social constraints related to attitude, tradition and customs. This requires an open attitude and acceptance on the part of local community, concerned authorities and policy makers regarding increased participation of women in these projects. Such favourable conditions may be created through public awareness campaigns.

In societies where men and women are strictly divided, and in societies where women have no visible role in decision making, one of the strategies to effect cultural change is to introduce new ideas and concepts to the younger generation. School children should be exposed to ideas concerning gender equity, and the important role that women could play in decision-making. As children are more adaptable to new ideas, values and concepts than adults, it is easier to effect cultural change through them.

Fourth, it would be useful to set up networks of women groups/associations, where they do not yet exist, at both community and national levels so that women could have the opportunity to share their knowledge and experience among themselves. This would also give rural women greater visibility and their ideas and needs greater weight in communicating with responsible authorities. It would also enable them to establish contacts with other non-governmental bodies and international women groups.

Fifth, if women are to assume a greater role in sustainable water development, appropriate opportunities and incentives for their participation must be created, for example, income generation opportunities. This requires targeting women's involvement, at all levels and at all phases of water development programmes/projects, as one of the fundamental objectives of these programmes or projects. Women's participation as managers of the environment may also be given priority in order to enhance their role in sustainable water development.

Sixth, women must be given equal opportunity as men, to receive proper education and training to enable them to attain necessary qualifications to assume responsible technical as well as managerial positions. Women in rural areas of developing countries often lack adequate knowledge and experience to effectively participate at decision-making levels. Strategies to address this problem include: promotion of education and employment opportunities for women, development of training material for women's participation in water development projects, and organizing training courses and workshops to train women in this field.

Projects towards achieving this objective should include the establishment and/or improvement of the data base on the existing technical capabilities of women in the field of sustainable water development and environment. Then, based on the requirements of each project, the nature, scope, level and extent of training programmes may be worked out to technically equip women to effectively take up their respective roles.

Capacity building of women and women groups through training would be more effective if training material such as guidelines, manual, modules could be developed in various specialized fields of water related sustainable development.

In this connection, it may be noted that UNDESD, in collaboration with INSTRAW and ILO Turin Centre had developed a set of training modules on women, water supply and sanitation in June 1991, and had conducted the testing and evaluation of the effectiveness of these training modules: first, in Banjul, the Gambia, from 2 to 6 September 1991 (7), with the participation of 23 participants from 4 African countries (the Gambia, Ghana, Liberia and Sierra Leone); and then, in Bangkok, Thailand, scheduled to be held in September 1992, with the participation of national experts from 8 Asian countries (Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Philippines and Thailand).

The workshop in the Gambia rated the training modules on women, water supply and sanitation as very useful and effective and the participants expessed their intention to use the modules in future national training courses to be organized in their respective counrties. A review of suggestions made by the workshop indicates that for effective promotion of women's role and their increased participation in water supply and sanitation projects, the preparation or training of women and women's groups in the field of water supply and sanitation is as important as training of decision makers, senior officials, engineers and trainers for increased women's participation, being addressed primarily by the training modules.

Other fields of water related sustainable development in which training material for women's participation may be developed are: application of solar and wind energy for water supply, rainwater harvesting techniques, reduction of water pollution along rivers, development of private-public investment schemes for sustainable water supply systems, etc.

Seventh, networks may be established at all levels (local, national, regional, and interregional) to maintain closer links among women's units in governments, rural women at grass-root level, international organizations and non-governmental organizations. This will eliminate duplication of work and help to provide more concerted and coordinated action in promoting the role of women in sustainable water development,.

Perhaps, one of the most important strategies to enhance the role and participation of women in sustainable water development is to mobilize funds for the implementation of projects promoting women's participation. There are usually two kinds of funds used in such projects: (i) Local currency, which can be made available by national governments in terms of budget appropriation or by local non-governmental and women's organizations through fund raising activities; (ii) Hard or foreign currency, which may be made available by donor countries and agencies and international funding agencies in terms of loans and grant.

The willingness of external funding agencies to finance women development projects could be enhanced significantly if the proposed projects have the ability to generate enough revenue to facilitate the return on investment in a reasonable period of time. One notable example in this regard is the small-scale development projects financed by the Trickle Up Program. It should also be noted that a strong commitment by governments to allocate funds for the projects from national sources is likely to stimulate greater external support.

Finally, it is necessary to include monitoring and evaluation as integral components of women development projects, to assess the progress made from time to time with regard to the improvement of women's role and their well being as well as the effectiveness and impact of these projects (8). Monitoring is an on-going activity which helps decision-makers to determine whether or not sufficient progress has been made in project implementation as planned, and if not, to take appropriate corrective measures to pick up the progress. Besides, monitoring enables the collection of factual data, which are necessary for periodic evaluations. Evaluation is a management tool which not only allows decision-makers to determine whether the expected results have been achieved as a result of a given input of resources, but also to find ways to improve the results of implementation of on-going projects as well as those of new projects being planned, based on the experience learned from completed projects. Consequently, projects on the development of statistics and indicators of the progress made in enhancing women's role and contribution to water development would be very useful.

VIII. POTENTIAL PROGRAMMES/PROJECTS FOR PROMOTION OF WOMEN'S INVOLVEMENT IN WATER-RELATED SUSTAINABLE DEVELOPMENT

Some of the potential topics or themes on which programmes or projects may be developed for promoting women's role and involvement in water-related sustainable development are:

- Environmentally sound development and management of sustainable water supply and sanitation;
- Use of solar energy for sustainable water supply;
- Use of wind energy for sustainable water supply;
- Application of handpumps for sustainable water supply;
- Use of appropriate technologies for the control of droughts and desertification;
- Rain water harvesting for domestic water supply;
- Reduction of water pollution along rivers and coastlines;
- Development of private-public investment schemes for sustainable rural water supply systems.

Potential work programmes and projects promoting women's involvement in water-related sustainable development on the first five topics are presented in the compendium of project profiles on women, environment and sustainable development, issued separately. Each programme or project consists of a number of activities, any one or more of which may be selected for implementation depending on the requirements of each situation.

The work programmes and projects being proposed are:
(a) Promoting Women's Role and Participation in Environmentally Sound and Sustainable Water Supply and Sanitation;
(b) Promoting Women's Role and Participation in the Use of Solar Energy for Sustainable Rural Water Supply;
(c) Women in the Use of Wind Energy for Sustainable Water Supply;
(d) Women in the Application of Handpumps for Sustainable Water Supply;
(e) Women in the Use of Appropriate Technologies for the Control of Droughts and Desertification.

Detailed project documents of course will have to be prepared on these projects to meet the requirements of donors for funding, should any one of which is selected for implementation. DESD is in a position to provide technical assistance to any developing country in the preparation of such detailed project documents on request.

Annex 1.

Success stories of women's leading role or participation in water and environment sectors (by regions as well as by countries)

Success Story No.	Description of Activity	Name of Presenter (Country)
AFRICA		
1.	Sanitary facilities for the Kgalagadi district of Botswana.	Ms. Goitsemang Baebele (Botswana)
2.	*Maji Safi* women's group in Kenya conserves water.	Ms. Mercy Mwamburi (Kenya)
3.	Muguna B water project provides water for a variety of purposes in Rwanyanga community, Meru district.	Ms. Luisa A. Owiti (Kenya)
4.	*Jiwruok* Women's Group Improves a Fresh Water Fishery in Western Kenya.	Ms. Emily Grace Othieno (Kenya)
5.	Women's Group Supplements Water Supply in a Semi-Arid Eastern Province of Kenya.	Ms. Margaret Ndoko (Kenya)
6.	*Maputo*, Lesotho Community Development Improves Year-Round Availability of Water and Food.	Ms. Alice Mefi (Lesotho)
7.	Creek Management by the Women of Degema-Abbey, Nigeria.	Ms. O.A. Salau (Nigeria)
8.	Fresh Water Supply Infrastructure in Rwanda.	Ms. Veneranda Nikwigize (Rwanda)
9.	Safe Water for Senegal.	Ms. Hadijatou Beye Diouf (Senegal)
10.	The Tooseng Water Committee Improves One South African Community's Access to Clean Water.	Ms. Mimie Sesoko (South Africa)

11.	Well Project in Chiredzi District, Zimbabwe.	Ms. Ruth Chipfunde (Zimbabwe)
12.	Independent Rural Village Project in Zimbabwe Constructs Wells and Provides Health Care Education.	Ms. Christine Nyabunze (Zimbabwe)

ASIA AND THE PACIFIC

1.	Mark II Pump Repair Training Program for Women in Tharu Tribal Community, India	Ms. Hira Sharma (India)
2.	Towards Environmental Transformation: A Baha'i Experience.	Ms. Janak Palta McGilligan (India)
3.	*Utthan-Mahiti* Water Pond Project in Gujarat State, India.	Ms. Nafisa Barot (India)
4.	Lakaki Lake Preservation Project, India.	Ms. Meera A. Bondre (India)
5.	Women in Bumiredjo Village, Indonesia, Obtain a Safe Water Supply.	Ms. Kuraisin Sumhadi (Indonesia)
6.	Radio Show Spreads the Word about Water, Health and Sanitation to Thousands in Indonesia.	Ms. Fitri Aini (Indonesia)
7.	Research Project on Controlling Organic Water Pollution Caused by Industries in China.	Mrs. Yi Qian (China)
8.	Research and Monitoring Program Preserves Lake Kinneret in Israel.	Ms. Colette Serruya (Israel)
9.	A Gravity-flow Water Supply Project in the Northern Hilly Regions of Myanmar.	Ms. Daw Nyo Nyo Win (Myanmar)
10.	Woman Instigates a Series of Environmental Projects in Nepal.	Ms. Chitra Kumari Thapa (Nepal)
11.	Water Projects Help Dangsa-ri Island Residents Obtain A Clean Water Supply.	Ms. Marcia Im (Republic of Korea)
12.	The *Samanalagama* United Women's Association.	Ms. Kamini Meedeniya Vitarana (Sri Lanka)

13.	Mitigation of Groundwater Crisis and Land Subsidence in Bangkok.	Ms. Vachi Ramnarong (Thailand)
14.	Girl Guide Association of Thailand's Water and Sanitation Program in Ban Bok Village.	Ms. Daranee Wenuchan (Thailand)
15.	Middle Path in the Hills: Farming with Nature.	Ms. Tuenjai Deetes (Thailand)
16.	Provision of Safe Drinking Water in a Rural Vietnamese District.	Ms. Pham Thi Thoa (Viet Nam)
17.	Water Supply and Treatment in Daiang Commune.	Ms. Luong Thi Truong (Viet Nam)

EUROPE

1.	Female Farmers in the Netherlands Organize for Sustainable Agriculture.	Ms. Johanna Schuurman (Netherlands)
2.	Exposing the Toxicity of the Elbe River Basin, East Germany.	Ms. Renate Walter (Germany)
3.	Citizens Environmental Movement, USSR.	Ms. Maria V. Cherkasova (USSR)
4.	Increasing Public Awareness on the Importance of Protecting Ecosystems in the USSR.	Ms. Natalia Salomatina (USSR)

LATIN AMERICA AND THE CARIBBEAN

1.	One Woman Campaign Moves Government to Stop Groundwater Contamination in West Indies.	Ms. Veronica Yearwood (Antigua and Barbuda)
2.	Project Raises Awareness about Pollution in Mantanza-Riachuelo River and Surrounding Urban Areas.	Ms. Maria Onestini (Argentina)
3.	Environmental Impact Considered in Dam Projects in Argentina.	Ms. Irene Rut Wais de Badgen (Argentina)
4.	An innovative breakthrough for clean water in the Amazon Region.	Ms. Maria de Nazare Oliveira Imbiriba (Brazil)
5.	CODERENA (*Comite de Defensa de los Recursos Naturales*) Works to Prevent a Mining Project Near La Vega, Dominican Republic.	Ms. Wilfrida Ramona Garcia Perez (Dominican Republic)
6.	Women's Group in Tripoli, Honduras Addresses	Ms. Carmen Bustillo Turcios

	Watershed Degradation Related to Deforestation.	(Honduras)
7.	Sara Aguilera organizes artisanal fishermen and small farmers to resist wetlands conversion.	Ms. Sara Aguilera (Honduras)
8.	Socio-economic Program for Women's Organizations: The Experience of Tempoal, Mexico.	Ms. Bertha Rivera (Mexico)
9.	Laubach Literacy International's clean water and fish pond project.	Ms. Guillermina Lopez Bravo (Mexico)
10.	Training to allow participation of the community in projects concerning water and sanitation.	Ms. Norma Barreiro (Mexico)
11.	Protection of fresh and brackish water fishery resources.	Ms. Graciela Fabiano Gonzalez (Uruguay)
12.	GEMA (Study Group on Women and Environment) Raises Awareness of Mercury Contamination in the Gold Mines of Guayana, Venezuela.	Ms. Flor Isabel Tur (Venezuela)

NORTH AMERICA

1.	Women Fight the Use of Sludge on the Chesapeake and Delaware Canal.	Ms. Isedora Hayward Ballard (USA)
2.	Lake Michigan Federation Works to Protect one of the World's Most Important Fresh Water Sources.	Ms. Lee Botts (USA)
3.	Chesapeake Bay Citizen Monitoring Program.	Ms. Kathleen K. Ellett (USA)
4.	The Lake Erie Basin Committee (LEBC) Helps Clean Up Lake Erie.	Ms. Noreen Gebauer (USA)
5.	Concerned Citizens' National Water Center in Eureka Springs, Arkansas.	Ms. Barbara Harmony (USA)
6.	The Adopt-a-Stream and Storm Drain Stenciling Program of the Wildwood Girl Scouts.	Ms. Marcha Hunt (USA)
7.	Nebraska Groundwater Foundation.	Ms. Wanda Johnson (USA)

8.	Citizens Coordinating for Clean Water in Lebanon, Pennsylvania.	Ms. Jo Ellen Litz (USA)
9.	Louisiana Environmental Action Network Empowers the Rural Poor to Protect Louisiana's Waterways and Environment.	Ms. Marylee Orr (USA)
10.	The Legal Environmental Assistance Foundation's Groundwater Protection Program.	Ms. Suzi Ruhl (USA)
11.	Local Residents in Naugatuck, Connecticut, Form Pollution Extermination Group (PEG) to Close Landfill Contaminating Water Supply.	Ms. Mary Lou Charon (USA)
12.	Lahontan Valley Wetlands Coalition Obtains Water Rights for Stillwater Wildlife Refuge.	Ms. Rose Strickland (USA)

Source:

Extracted and collated from official documents of the Global Assembly of Women and The Environment, "Partners in Life", Miami, Florida, USA, 4-8 November 1991.

Annex 2.

Summary of the problems addressed, the activities undertaken, and the results obtained, corresponding to each success story presented in Annex 1.

Success Story No.	Problem Addressed	Activity Undertaken (with women as leader or participating member)	Result
AFRICA			
1.	A severe outbreak of diarrhea occurred in the Kgalagadi district due to water contaminated with human and animal waste.	Six members of the Kgalagadi District Health Council undertook sanitation programs in the district's 28 villages, building toilets to demonstrate to villagers, with funds from the Ministries of Health and Local Government and Lands.	Three months after the implementation of the project, the incidence of diarrhea decreased. By the end of 1990, 280 toilets had been built.
2.	Water supplies were inadequate for household use and for the cultivation of vegetable gardens. Fuelwood was scarce and households lacked adequate latrines.	Women in the Taita/Taveta District of Kenya formed a women's group that helps each member to harvest rainwater, acquire a fuel-efficient jiko (stove), and build or improve her family latrine, based on her own priorities.	Most members are now conserving thousands of gallons of water, which creates a large reserve of water for use during the dry season. Women have more time to engage in productive activities. Vegetable gardens thrive, and nutrition and health have improved.
3.	Residents of Rwanyange Community in the Meru District suffered from health and sanitation problems, primarily due to the lack of clean water and adequate medical facilities.	The women organized themselves into a self-help group and, with the help of the YWCA, designed and implemented the Muguna B Water Project to provide a clean source of water for drinking and irrigation. They installed a water pipe network that carries clean water from tanks to their homes.	The community was able to meet local needs for clean water and sanitation. These efforts helped to eradicate water-borne diseases.

4.	Unemployment, nutritional deficiencies and low family income plagued a community in western Kenya. Freshwater fisheries in the area could improve nutrition and generate income, but they were not being developed or managed appropriately.	Emily Othieno revived the interest of local women in developing a fish farming project, and helped them to make rational use of inland water bodies and achieve maximum production without over-exploiting the natural resource base.	The participants received environmental and economic benefits such as better nutrition, income generation, employment and environmentally-sound resource utilization.
5.	Water shortages were of concern, especially to women in the semi-arid eastern province of Kenya.	Margaret Ndoko launched a project involving a women's group to improve the community's water supply. Project participants initiated a water conservation program by planting trees and conserving water in a catchment area.	The project has been successful. The group has planted numerous trees and started a tree nursery.
6.	In Maputo village 2/3 of the 43 households are headed by females due to emmigration of men to South Africa. Rainfall and soil productivity are limited and soil erosion is extensive. Women lack access to health and technical assistance.	An integrated project was started to help women organize themselves effectively in generating alternative sources of income, gaining access to basic facilities, and appropriate technology.	Water is now available year-round, and food production and cash income have increased. The health situation is improving now that basic services are available. Women have been empowered with skills such as sewing, knitting and improved agricultural production.
7.	Oil exploration and exploitation in the Degema-Abbey community have caused pollution in local creeks. This has resulted in the depletion of marine life on which the	The women in the community have formed an enforcement group to implement resource management and conservation techniques.	The women have succeeded in devising an environmentally sound management strategy for coping with the depletion of natural resources. They have encouraged community participation towards this end.

	community's livelihood depends.		
8.	Rwanda, a Central African country, faced numerous environmental threats, especially concerning fresh water, due to a lack of environmental awareness and a lack of women involved in development projects.	In 1986, CARE (Cooperative for American Relief Everywhere) began setting up water supply infrastructures in the area of Byumba, Rwanda in order to improve the quality of the inhabitants' lives and to alleviate the burdens put upon women.	The information campaign, has helped people to take responsibility for the maintenance of the water supply infrastructure. The availability of fresh water has improved the health of the inhabitants and has alleviated women's burdens.
9.	There was a need for adequate supplies of safe water in rural parts of Senegal. Existing wells were contaminated, poorly located or in bad condition. Attendant problems include threat of drought to vegetation and livestock and malnutrition.	A project initiated by five Senegalese Soroptimist International clubs was adopted and a joint Soroptimist-UNICEF project was launched. New wells and pumping equipment were installed. Educational programs were implemented.	The health of community members improved. Agricultural production increased. The project created new jobs. The new wells provided a central meeting ground for villagers; thus, the project provided social benefits as well.
10.	The 3,000 residents of Tooseng lacked sufficient access to clean water. There were just two taps connected to the only clean source of water. The larger community drew water from an old and unprotected well, which was an unclean source.	A people-centered approach was used to help the village solve their water supply problems. The community was trained to maintain, repair and build their own water supply. They built a system of pipes and taps to increase access to clean water.	Tooseng now has better access to clean water due to the construction of a network of pipelines and standpipes using volunteer labor. Women and children spend less time collecting water. The general health of the village has improved.
11.	There was a lack of clean water in the Chiredzi Distric in Zimbabwe. People were forced to use contaminated water, and	The Lutheran World Federation (LWF) approached the District Administrator (DA) with	The project succeeded in supplying clean water to the community. There are now 176 boreholes, and 70% of the community

	this caused diseases such as cholera, typhoid, diarrhea and bilharzia in the population.	plans for employing people to maintain boreholes.	has access to clean water. Women no longer have to walk long distances to obtain clean water.
12.	Clean water and a proper waste disposal system were unavailable in this rural Zimbabwean village. Many women did not understand the connection between using impure water and the poor health.	A project to build wells and install a pit latrine system was implemented. Women received health education from a primary health care nurse.	The availability of clean water supplies for all families in the area has resulted in a decline in the incidencc of disease. Women are better educated regarding health care matters.
ASIA AND THE PACIFIC			
1.	The Tharu Tribal community suffered from sanitation and health problems due to polluted water.	TRYSEM (Training to Rural Youth for Self-Employment) offered a training program on the operation and maintenance of "India Mark II" hand pumps for the women and rural youth of the Tharu Tribal community.	Training of rural women on the health hazards of polluted water and to operate and repair water hand pumps help the community understand the importance of potable water and better maintain the source of clean drinking water.
2.	Contaminated water caused Guinea worm disease in 302 villages in a tribal district of central India. Seven hundred and fifty-two (752) people were infected and 211,813 people were at risk.	Awareness was generated among the affected communities. Tribal women were given health and environmental education and empowered with simple techniques such as sieving drinking water and using hand-pumped water.	The complete eradication of Guinea worms from over 300 villages was accomplished. The lives of the 752 infected people were saved, and the 211,813 people at risk were protected.
3.	There was a lack of appropriae and alternative systems for providing drinking water in drought-prone saline coastal areas of Gujarat, India.	Rainwater runoff is harvested in earthen tanks lined with low-density polyethylene to prevent seepage of rainwater as well as the salinity which contaminates stored water. This water is then filtered in	Water is now available all year round for people as well as cattle. The seasonal migration period of people has been reduced by 30 to 40%. Women no longer have to walk long distances to

		a slow sand filter and taken out by a hand pump.	collect water in summer, and the incidence of diarrhea and skin disease has been reduced, especially among children.
4.	Lakaki Lake in Pune, India was threatened by the planned construction of a school and a five-star hotel on the site. The lake was to be filled in and developers had started draining the lake on April 9, 1985.	Dr. Bondre used her research findings on the hydrobiology of the lake to defend its preservation. She organized an open-air "laboratory" on the shores of the lake for the general public. Concerned residents started a campaign to halt development.	Lakaki Lake was spared from development. Future development activities in Pune City will have to be approved by a committee including environmentalists and civic authorities. The public is more environmentally aware.
5.	Bumiredjo Village lacked a safe water supply system. The only accessible water resource is a polluted river located 1.5 kilometers from the village. Diarrhea epidemics killed many children and adults.	With women as the driving force, the village obtained permission from another village to share their spring. The women then motivated the entire village to develop a communal water supply plan through community self-help and self-reliance.	Diarrhea epidemics and serious skin diseases are eradicated. The infant mortality rate fell dramatically. With water close by, women have more time to devote to income-generating activities.
6.	Lack of adequate garbage disposal systems caused water pollution in rural areas. Villagers were not in the habit of using latrines, and water-borne diseases were widespread.	A community awareness project was initiated through radio, television, and group demonstrations. An additional project was set up by the Department of Public Works through key women farmers and Rosyadu Multipurpose Health Centers.	Women have better living conditions. More latrines were installed, and villagers were more conscious of keeping their drinking water clean. Significant reduction in the incidence of water-borne diseases.
7.	China has a serious water pollution problem. Organic pollution discharged by industry is	Yi Qian proposed and then managed a four-year research project on anaerobic treatment of high strength organic industrial	The ability to apply anaerobic treatment technology to ameliorate organic pollution by industries has improved.

	a major water quality issue.	wastewater. It involved 16 institutions ad 110 researchers, including Yi Qian, in different parts of China.	Three wastewater treatment plants and five pilot plants were set up.
8.	Israel's only fresh water reservoir, Lake Kinneret, which supplies 30% of the country's fresh water, was endangered by pollution. Economic development along the coast threatened to further pollute the water source.	Dr. Serruya spearheaded a 10-year research and monitoring program of Lake Kinneret.	The program gathered critical data necessary for the preservation of Lake Kinneret. The program results provided support for controlled economic development of the wateshed, preventing deterioration of the water quality of the Lake.
9.	Women and children in the northern hilly regions of Myanmar suffer in particular from the lack of adequate supplies of clean water and proper medical facilities.	A gravity-flow water supply project was implemented incorporating low operation and maintenance costs, and community participation in planning, implementation and maintenance. Women played a major role in project management.	Health benefits for the villagers and savings in time for the women. Daily per capita water consumption has risen. The Zodua villagers have agreed not to cut trees on the hill above and around the water source.
10.	The community faced problems such as polluted water, scarcity of drinking water, water-borne diseases, poor health and a general lack of basic facilities.	Chitra Thapa initiated a series of projects to ameliorate the situation: building of toilets, construction of drinking water and irrigation facilities planting of fruit trees.	Villagers have participated wholeheartedly in the activities and have begun to implement environmental measures on their own.
11.	The shortage of clean drinking water and the absence of proper washing and bathing facilities created a burden for women on the South Korean Island of Dangsa-ri. They were forced to travel to another island to	The community was educated about the relationship between health, sanitation and environment. A water supply project was carried out with collaboration among the community, the ACWW (Associated Country Women	Women are relieved from the burden of travelling to another island to obtain clean water, saving time and money. Community awareness on environmental issues was improved. For example, they no longer throw

	obtain clean water for their families.	of the World) and the government and local councils.	garbage and human waste directly into the sea.
12.	A hydropower project displaced families in Kinchigune to a distant location where they suffered from a poor quality of life due to scarcity of water, fuelwood and medicinal plants.	With Kamini Vitarana's help, the women formed a society in the resettled village to solve their economic and environmental problems (the need for water, fuelwood and medicinal plants).	The women are beginning to have better access to clean water. They get better prices for their tea and feel less despondent.
13.	Over-development of groundwater in Bangkok City resulted in land subsidence and contamination of fresh water. Land subsidence also caused serious flooding problems for the low-lying city.	The Department of Mineral Resources launched a project to mitigate the groundwater crisis. Project participants conducted extensive monitoring of groundwater levels and quality, and predicted the effects of alternative schemes.	Land subsidence rates decreased in Bangkok between 1985 and 1990. As a result, negative environmental impacts were avoided.
14.	The village of Ban Bok had widespread dry season water shortages and very few latrines. Diarrhea and other health problems relating to sanitary conditions were common, as were poverty and high levels of indebtedness.	With support from UNDP's "Promotion of the Role of Women in Water and Environmental Sanitation Service" program, the Girl Guide Associaton of Thailand implemented a participatory women-focused water and sanitation project.	All households now have latrines. Water supplies have been expanded/upgraded. Diets and incomes have improved, and there is a more positive attitude toward women's participation in development activities.
15.	Deforestation, destruction of water resources and mismanagement of land resources has occurred due to population pressure, inadequate government policy and lack of land tenure. Slash	The Hill Area Development Foundation (HADF) worked with hill tribes in several villages to apply integrated farming and alley cropping technologies to recover the degraded environment.	The forest and watershed are protected, the fertility of the soil has been restored, and the productivity increased. This area is used as a model for highland sustainable agriculture for future govenment policy.

	and burn agriculture has led to soil erosion.		
16.	Water pollution is serious in Quynh Phu District, and it causes widespread health problems. More than 70% of the district's people suffer from water-borne diseases, especially intestinal parasites.	In conjunction with local health service authorities, the Water Resources Development Institute for Hydraulic Research conducted a well construction pilot project in one vilage and then expanded the program to cover three other vilages.	Eight hundred and fifty-three wells with filter systems were constructed in four villages. As a result, 70-80% of the families in these four villages have access to cleaner drinking water.
17.	Demand for fresh water far outstrips supply in Red River delta lowland villages; epidemic and infectious diseases were widespread.	The Rural Development Center studied conditions in the area; designed simple, effective and low-cost water supply and treatment schemes; and pilot-tested some schemes in Daiang Commune with the help of women volunteers.	Water filtration systems and pumps were available for 30 families and a 15-bed clinic. In addition, a number of hand-dug wells now have filter tanks and pumps. Residents now have access to clean water.
EUROPE			
1.	Agricultural developments and policies in the Netherlands and the EC have had serious consequences for the environment. Farmers are pushed to extensively apply chemical fertilizers, causing severe groundwater pollution.	By forming a coalition of those affected and concerned, a venue was created to discuss common problems and possible solutions. Hearings were held with agricultural experts and policymakers at the national and EC levels.	Policy makers and parliamentarians are being stimulated to review the present situation and take necessary steps to remedy the problem. The telephone hotline establishsed by the group receives up to 150 calls per day.
2.	Chemical and organic pollution in the Elbe River Basin has contaminated the drinking water supply, causing a health threat to the local	Dr. Renate Walter led a research effort which studied the link between Elbe River pollution and public health. After the study found an increased cancer risk, Dr.	Dr. Walter's research and her efforts to make the public aware of the study's findings greatly increased awareness of water pollution and the

	people. However, there was a lack of hard data on the extent of the health risk posed by this pollution.	Walter began a public awareness campaign to educate the affected population.	health risks associated with inadequate fresh water supply.
3.	A hydroelectric dam was planned which threatened to flood a beautiful historic wilderness area, erode fertile land, and leach mercury and other toxics out of the rock and into the drinking water of millions of Soviets living along the Katun and Ob Rivers.	Maria Cherkasova coordinated a five-year grassroots effort to block construction of the dam. Committees for the salvation of the Katun River were established in six cities. Activists in these committees mobilized tens of thousands of local citizens.	Construction of the dam has been postponed. Consciousness of people for environmental protection increased. Those involved gained broad experience in the techniques of environmental activism which led to national environmental conferences.
4.	Human activities are having a negative invluence on the ecological equilibrium of ecosystems. A lack of environmental education and information exacerbates the problem.	Natalia Salomatina, a Soviet biologist, conducted research into the long-term effects of human activities on amphibians. She also gave lectures to raise the public's awareness of the importance of protecting nature.	Her efforts resulted in environmental and ecological benefits for participants and the community, including a more rational use of natural resources, a reduction in pesticide usage and the maintenance of ecological balance in ecosystems.

LATIN AMERICA AND THE CARIBBEAN

1.	There was serious contamination of groundwater used for domestic purposes in some areas of Antigua.	Veronica Yearwood campaigned for a groundwater management program to provide clean and safe drinking water to poor families.	A cost-effective groundwater management program was implemented that resulted in cheaper and safer drinking water in the affected areas.
2.	Chemical and organic pollution contaminates the river basin surrounding Buenos Aires. The effect	Maria Onestini directed a project to create awareness of the problem and the consequent health effects on	The project succeeded in increasing the community's awareness about the link between

	is a dearth of clean water for people who lack running water, which is the majority of the poor inhabitants.	the population. The task entailed helping existing organizations to become aware of the grave pollution problem of the river basin.	pollution and health. Media, governmental/NGO liaison groups and neighborhood groups have mobilized to seek solutions.
3.	Industrial and energy projects such as dam projects along the Patagonia Negro and Parana River Basins have caused water pollution and environmental degradation. The affected populations lacked awareness of the issues.	Convinced that through awareness community members will press the decision makers to take action, Ms. Wais de Bagden launched an education program to educate the affected populations.	Local inhabitants are now pressing auhorities to take acion to solve these problems and to require that new development projects take into account any anticipated environmental problems.
4.	The very high water table in the Amazon region and contamination by human waste, coupled with the hot climate, pose a serious health risk. Traditional technical solutions such as deep wells and/or centralized water systems are too expensive.	A project was carried out where water was drawn from the superficial water table and decontaminated by passing it through simple, durable and low-cost equipment. This inexpensive and reliable method makes small decentralized systems economical.	Safe, clean water is provided at only one-fifth of the previous cost, and community participation has been enhanced. The state government of Para has decided to adopt this approach for a massive potable water campaign.
5.	A major mining project, planned less than seven kilometers from La Vega, threatened the animal and plant life of the area and would pollute the rivers and streams that provide water to the general population.	A citizen's group, CODERENA (Comite de Defensa de los Recursos Naturales), was formed to help educate the area's population about the effects that this mining project would have on their local environment.	The mining project originally set for early 1989 was delayed. While the Dominican Government still has a contract with the mining company, the goal of CODERENA is to have the forest designated as a regional park.
6.	Watershed degradation and contamination related	The women of Tripoli formed a group in order to	People now have a better understanding of why soil

	to deforestation were primary problems affecting the mountainous region near Tripoli. Polluted water particularly affected children.	address the problems with the help of the Office of Natural Resources. A program implemented by the agency and funded by FAO provided the women with practical training on environmental issues.	and water conservation techniques are important and have begun using them in their daily lives. Erosion in the mountains has been reduced by nearly 50%.
7.	The creation of a new shrimp industry threatened to destroy more than 1,000 hectares of wetland and forest along the southern coast of Honduras. This threatened wildlife, birds and marine life, as well as the livelihood of 2,000 families.	Dona Sara Anguilera organized the people in the surrounding communities to halt the continued destruction and takeover of this area by corporate concerns.	The people can once again earn their living and feed themselves from the land. The Ministry of Natural Resources has now designated El Jicarito lagoon as a reserve area for wildlife and artisanal fishery. The wetlands and surrounding forest have been protected from destruction.
8.	Women in Tempoal are poor and overburdened, often working 18-hour days, including three hours daily to fetch water and two hours to search for firewood. They lacked training, credit opportunities and paid employment.	A project funded by UNIFEM, ZONTA and the Mexican Government promoted women's organization, training and the dissemination of simple technologies that save time and energy for undertaking household and production tasks.	Grassroot organizations and women's groups have been strengthened. 300 hand-operated water pumps had been installed, creating employment and reducing women's burdens in collecting clean drinking water.
9.	The inhabitants of the Tinaja de Negrete area of Mexico, a very arid region, lacked a source of clean drinking water and nutrition. Polluted water caused intestinal diseases.	The Mexican staff of Lauback Literacy International initiated a literacy program to enable local community to work together on clean water supply and aquaculture (fish pond) projects.	Participants acquired basic literacy skills. Availability of clean drinking water and better nutrition to 5,800 people in the area.
10.	Little or no participation	*Sarar Capacitacion* helps	People in the community

	of the affected communities in water and sanitation projects at the beginning and intermediate phases, including operations and maintenance.	government agencies and non-governmental organizations to train people in the community to organize and administer their own projects.	and technicians can now make decisions together, enhancing the continuity of the projects.
11.	The most important species in the coastal lagoons of the Uruguayan province of Rocha, particularly pink shrimp, are being overfished. Fishery productivity fluctuates widely from year to year.	The *Instituto Nacional de Pesca* and the provincial government organized a research program on the effects of regulating the opening of sand bars on aquatic life. Artisanal fishermen participated in the program.	The research generated norms for the management of the fishing resources and the preservation of aquatic life in the coastal ecosystems, stabilizing the shrimp catch of the artisanal fishermen.
12.	The use of mercury in the gold mines of the Guayana region has contaminated the water, soil and air. Mercury contamination is widespread among the population.	GEMA (Study Group on Women and Environment) initiated a project to create awareness among gold miners and the population on the dangers of mercury contamination and to bring this problem to the attention of the national and international communities.	GEMA has collected scientific information, through participation in foras throughout Venezuela, and conducting site surveys. In addition, GEMA generated awareness of the problem by discussing it at national and international forums.
NORTH AMERICA			
1.	On the banks of the Chesapeake and Delaware Canal, sludge was used as fertilizer. It endangered groundwater supplies for humans, livestock and crops as well as surface waters used for recreation and for finfish and shellfish harvesting.	Women residents organized a grassroot network to end sludge use. Their "Sludge Busters" publicity campaign informed and mobilized area residents in a Canal Environmental Protection League.	The use of sludge was stopped, preventing further contamination. A Canal Study Group now monitors test wells on sludged sites in order to prevent leaching of toxics into water supplies and cropland. The group has received national recognition.

2.	Water pollution in Lake Michigan affected drinking water, contaminated fish and threatened the food web, including humans.	The Lake Michigan Federation was organized as a research and advocacy orgaization.	The Federation succeeded in influencing public policy in solving Great Lakes problems, in halting and preventing further pollution of the Great Lakes.
3.	The Chesapeake Bay Program needs accurate data and information in order to make decisions concerning the restoration and protection of the Bay. Government agencies cannot collect the needed data, particularly in times of diminishing budgets.	A volunteer monitoring project was set up to gather the necessary data for the Chesapeake Bay Program.	Useful and reliable data gathered by volunteers has proved invaluable in long-term government water quality management. Information and advice has been requested from groups in all parts of the U.S. as well as from Mexico, Thailand and European countries.
4.	Lake Erie Basin was being contaminated by the use of manufactured detergents containing phosphates. Unregulated industrial dumping and farming practices were also abusing the lake.	The Lake Erie Basin Committee (LEBC) educated the public and placed pressure on state and local legislators to pass environmental legislation regulating farming practices and industry (e.g. banning soaps containing phosphates and regulating industrial dumping).	Aquatic life has come back to the lake. Water is now clearer and cleaner. Commercial fishing is on the rebound. The threat to the water supply posed by detergent phosphates has declined dramatically.
5.	The town's natural springs were polluted by sewage, and the placement of a new sewage treatment plant threatened wildlife and nearby residents. The public had not been consulted in the planning of the waste management facility.	Concerned citizens formed the National Water Center to address the local water pollution problems. The National Water Center brought the issue of water to the forefront and increased public participation.	The sewage treatment plant was prevented from being located in an environmentally fragile area. There is now an improved sewage treatment plant in operation. Many community members now use compost toilets.

6.	As metropolitan areas have grown, more streams have become polluted. They have become dumping grounds for everything from fast food containers to kitchen appliances. Storm drains carry a variety of pollutants into streams and groundwater.	The Wildwood Girl Scouts cleaned up local creeks and waged a public education campaign. This included door-to-door distribuion of booklets and the stenciling of anti-pollution messages on storm drains. Since 1989 six Wildwood creek cleanups have occurred.	Tons of debris have been removed from the creek. Formerly routine dumping sites remain relatively free of debris following cleanups. Property owners along the creek are becoming watchdogs for pollutants and debris.
7.	Nebraska's groundwater is being threatened by hazardous waste and landfill problems. In addition, climate changes and increasing urbanization and development pose threats to the water supply.	Nebraska Groundwater Foundation (NGF) was created to serve as an educational resource on the issue of groundwater. NGF provides a clearinghouse, speakers' bureau and outreach activities as means to teach environmental awareness.	The program has been effective, replicable, economically feasible and sustainable in meeting community needs. In 1990 the program received the Renew America Environmental Achievement Award.
8.	The Swatara Watershed in Pennsylvania was endangered by pollution. There was a lack of awareness among the public about water issues.	Citizens Coordinating for Clean Water (CCCW) was formed to educate and inform the public about the necessity to preserve the Swatara Watershed.	CCCW has succeeded in having the Swatara Creeks designated as "recreational rivers" in the Pennsylvania Scenic River Program.
9.	Louisiana ranks first in the U.S. in the discharge of toxic pollutants to water and second in the discharge of such pollutants into the air.	The Louisiana Environmental Action Network (LEAN) was formed to aid organizations and individuals in cleaning up the environment through organization of workshops and training sessions.	LEAN has successfully mobilized people power to secure passage of legislation to clean up the land and water.
10.	Few avenues of recourse are open for victims of groundwater contamination. Citizens played little or no role in	The Legal Envronmental Assistance Foundation created the Groundwater Protection Program to protect underground	Citizens have gained valuable skills/tools to protect groundwater. Existing sources of pollution have been

	policy development on the issue, and there was little accountability for enforcing anti-pollution laws.	drinking water from contamination by strengthening citizen involvement in resource protection and pollution prevention.	cleaned up, and stricter environmental standards put in place. Legal action has been taken against polluters of groundwater.
11.	Laurel Park Landfill in Naugatuck, Connecticut posed an environmental threat to the community. Chemicals contaminated the aquifers that feed the groundwater supply. Noxious odors from chemicals and fires filled the air in the town.	A Pollution Extermination Group (PEG), was formed when Mary Lou Sharon observed orange leachate oozing toward her backyard. PEG pressed state government authorities to close the landfill, install monitoring wells and supply potable water for bathing, drinking and cooking.	A $20 million cleanup plan was initiated by the USEPA. An agreement has been signed between the Department of Environmental Protection and Uniroyal (potentially responsible party) to supply approximately 52 families with potable water.
12.	Stillwater Wildlife Refuge, as well as other wetland areas, did not have water rights and was in danger of becoming a toxic wasteland. Wildlife began to die by the thousands.	Rose Strickland led the Lahontan Valley Wetlands Coalition to obtain water rights for Stillwater.	Stillwater was made part of the Truckee-Carson River Settlement Act. Some farmers have sold their water rights to sustain the refuge and fresh water is again flowing into the wetlands.

Source:

Extracted and collated from the official documents of the Global Assembly of Women and the Environment, "Partners in Life", Miami, Florida, USA, 4-8 November 1991.

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Environmental Impacts of Renewable Sources of Energy 1/

(Agenda item 9(c) of the Provisional Agenda)

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Introduction

Women and New and Renewable Sources of Energy

The development of clean, reliable and diversified energy sources has become a major area of concern in all countries today. It is one of the most critical issues in relation to developmental and environmental policy. There is a growing awareness that many energy choices are not sustainable - either ecologically or economically. Energy production also creates the potential for environmental change, including pollution of air, water and land. Some energy sources and their use threaten massive changes in global climatic conditions, with severe consequences for development.

As with all development problems, the issue of new conventional and renewable energy sources (NRSE) is multi-dimensional. The energy system is the underpinning for overall economic and social development, including: rural and urban development, agriculture, industry, transport, services and housing. Moreover, all these areas are interconnected; changes in one sector will have significant implications for the others.

As energy demand increases in the developing world, the severity of their impacts will grow unless new understanding and new energy use patterns are developed. Unfortunately, the financial resources required to address the problems are of considerable magnitude, and subject to competing national interests. Since the patterns of energy supply and consumption adopted today will determine environmental impacts well into the next century, the question is one of how to develop environmentally sustainable energy strategies which avoid or minimize these consequences and which enhance economic and human resource development, particular that of women. In developing countries, women provide much of the human energy required for subsistence needs, and are, at the same time, the primary users and providers of household energy. In developed countries, women influence patterns of use and the amount of energy consumed. In both cases, however, women pay the consequences of declining energy resources and rising prices.

In Africa, for example, where fuelwood constitutes 90 per cent of household energy, women often spend several hours every day fetching fuelwood, and they even have been blamed for ecological destruction through deforestation. However, worldwide patterns of deforestation are primarily the result of commercial logging, agricultural development, migration and resettlement, and demand for charcoal.

The consequences of insufficient and inefficient energy sources are particularly harsh for women in rural and peri-urban areas. In many instances, women are responsible for obtaining fuelwood and other energy resources, in additional to their roles as disseminators, users, family educators, motivators and agents of change. They are directly dependent upon the natural resource base, and sustainable natural systems are fundamental for the survival of their families.

In developing countries, women have a small share in the modern centralized production and distribution of energy, particularly in the urban community. In rural areas, however, they represent an important factor in the planning, utilization and production of energy for household and community consumption. Since commercial energy is often neither affordable nor readily available, they mainly depend on traditional (e.g. fuelwood and other biomass) and new and renewable sources of energy.

Women are confronted with several constraints in achieving full integration and participation in energy-related activities, including: lack of education and training; lack of participation in energy planning, programming and project design; lack of information and awareness-raising methodologies; lack of financial means and access to credit; and lack of access to choice with regard to various types of technologies. One of the major reasons for such constraints is that policy-makers, energy planners and project managers lack both information about women's involvement in the energy sector, and the capacity to plan for, and implement, appropriate approaches to promote women's involvement.

The structuring and implementation of policies to reach out and involve women in the energy sector is a prerequisite for environmentally sound and sustainable NRSE programmes. Policy-makers and planners should evaluate the real impact of women's work on the management and use of energy, especially in rural areas, in order to influence in a positive and productive manner in the use of NRSE sources. Although particular attention has been directed towards research, training and capacity-building at national and regional levels is increasingly oriented to ensure the involvement of women in renewable energy programmes. Many NRSE programmes fail, however, to provide adequate training of community members, particularly women, who, either voluntarily or for small compensation, carry out local maintenance and management. This problem reflects the relatively recent change from centralized, agency-managed systems to more decentralized, participatory approaches, as well as the limited number of evaluations of the functioning and efficiency of local facilities. The same is true for recruitment and training of technical staff involved in community and national NRSE projects. Most approaches still emphasize technical skills, and pay less attention to management, socio-economic and environmental aspects. The design of training courses for national programme managers and engineers, with more training courses for community workers, provide opportunities to stress the involvement of women - from which both projects and communities can benefit.

The question is how to create relevant training materials which will (a) more appropriately serve the needs of women and of development officials, who frequently exclude women from development processes; and (b) link issues relating to women, new and renewable sources of energy and environmental aspects in order to strengthen national institutions, promote various technically viable technologies, and enhance awareness-building, information and communication. It is time for the formulation of long-term policies for all energy-related activities to ensure sustainable development. Women as users, consumers and collectors of various sources of energy represent both problem and solution of to the energy-environment-development equation.

The following sections describe various new and renewable energy sources, and their impacts on the environment.

Part A: Environmental Impacts of Renewable Energy Sources

I. Geothermal Energy

The source of geothermal energy is the natural heat stored in the earth. Although the number of geological deposits that could potentially yield enough heat for direct use or for power generation is extremely large, only those deposits of heat concentrated at depths attainable by drilling, in confined volumes, and at high temperatures are commercially exploitable.

Geothermal resources are classified according to geological formation. There are three different types: hydrothermal convection systems, hot igneous systems, and conduction-dominated systems. The latter two formations have not provided any commercial applications and in most cases have been found to be infeasible for direct use or for power generation.

Hydrothermal convection systems consist of a source of heat (hot rock) and a permeable rock formation which contains water. The water is heated by the hot rock underneath and rises. A cap of impermeable rock near the earth's surface traps the heated water.

Depending on whether water or steam is produced in the near-surface permeable zone, hydrothermal convection systems can be further subdivided into hot water or vapor-dominated systems. Hot water systems are the most common for power generation applications. In that category, the methods most often used to generate electricity are the flashed steam process and the binary cycle process.

Vapor-dominated systems produce superheated steam, which is usually fed directly into a conventional steam turbine to generate electricity.

1) **Environmental impacts**. There are significant differences between the exploitation of geothermal energy and that of fossil or nuclear fuels. First, the entire geothermal energy fuel cycle, from resource extraction to transmission, is situated at one site. Second, geothermal does not require large-scale capital construction or resource inputs.

As with conventional fuels, however, geothermal exploitation produces adverse (and site-specific) effects on land, air, and water. The following information is drawn from studies of two geothermal fields: The Geysers field, in northern California, and the Wairakei field, in New Zealand.

a. **Impacts on land**. To set up a geothermal development, survey lines must be laid and access roads must be built. As a result, virgin areas may have to be opened and partially cleared. Also, tapping geothermal resources on soft rock areas can cause land erosion and slips. Finally, geothermal sites are usually in seismically active zones, and one concern is that withdrawal and reinjection of geothermal fluids may increase microseismic activities in the immediate area.

Compatibility between the geothermal development and surrounding land uses is extremely important. The amount of land required for development varies from site to site. For dry steam fields, an estimated 0.19 to 0.32 hectares (ha) is needed per MW; for a hot water field, around 1.6 ha/MW.

Land subsidence, or sinking, caused by the withdrawal of fluids from geothermal reservoirs can also be a problem, mainly for liquid-dominated systems. In Wairakei, for example, both vertical and horizontal surface deformation have been found. Land subsidence may be avoided by reinjecting the geothermal fluids to the wells after power has been generated.

Recycled water contains potentially harmful substances such as ammonia and boron. Leaks and blowouts from pipes and valves may result, polluting groundwater aquifers. Reinjection may also lower the water temperature of the reinjected fluid, resulting in a decrease in the overall efficiency of the cycle. On the other hand, reinjection can lengthen a field's productive life by recycling heated water to the reservoir.

b. **Airborne effluents**. Air pollutants can be released during both the development and plant operation stages of geothermal power production. In addition, steam containing various polluting gases in non-condensable form is directly released into the air during all phases of geothermal power development.

The composition of the gas stream varies widely with the field in question, but carbon dioxide (CO_2) usually predominates. Withdrawal and processing of geothermal fluids to generate electricity also cause the release of gases that are not condensable at normal atmospheric conditions. Since the steam produced during development originates from the same underground source as the plant's working fluids, the steam will contain a number of gases. Hydrogen sulfide (H_2S) is the most important gas, and is found in most high-temperature geothermal fields.

Although H_2S is considered to be toxic at concentrations over 10 ppm (parts per million), the main concern is its rotten-egg smell. Several processes have been proposed and tested to control the emission levels of H_2S, including technologies adapted from the coal industry. Processes that rely on chemical reactions rather than physical removal seem to work better.

Other gases released during plant operation include carbon dioxide (CO_2) and ammonia (NH_3). Their overall emission level per unit of power is usually very low (much less than fossil fuel plants) and are not considered environmentally damaging. A non-methane hydrocarbon gas, benzene, usually is found in geothermal reservoirs of sedimentary origin. Benzene is a known carcinogen.

Some geothermal fields contain hazardous materials, such as radon-222 and mercury. Radon, a radioactive gas, diffuses to the atmosphere and sometimes to surrounding groundwater. Radon levels measured so far are well below ambient concentrations. Mercury is a component of some geothermal waters, usually in the steam and gas phases. In geoplants, mercury can be discharged either in gas or liquid form. The levels found in either form present no health hazard, as long as exposure is not prolonged.

c. **Liquid effluents**. In steam-dominated systems, a large fraction of the steam, condensed for cooling purposes, is not needed and has to be disposed as a liquid effluent. In a hot water geothermal electric station, there are four major effluent streams: hot mineralized water (from wells); surplus condensate with dissolved gases (similar to steam systems); waste gas flow; and vapor with impurities from cooling towers.

As previously mentioned, the physical and chemical characteristics of geothermal water are unique to each field. Still, most resource fluids contain large amounts of dissolved solids and heavy metals. Some of the dissolved solids (e.g., silica) eventually may damage plant components (pipes, valves, etc.), while salinity can cause contamination of nearby fresh water reservoirs. The release of high temperature well products into surface waters can cause further environmental effects.

Several methods for disposing of wastewater have been tested and used, including direct release to surface water bodies, evaporation, surface spreading to shallow reservoirs, desalination with re-use, and reinjection to the reservoir. Although the method will change from site to site, reinjection seems to be most promising.

d. **Thermal discharges**. Because of the low thermodynamic efficiency of geothermal plants (8 to 10 percent), a large amount of heat is wasted. Unless recycling technologies such as reinjection are used to increase the efficiency of the system, there is potential for thermal pollution.

II. Solar Energy

1. **Passive systems**. The most promising, and the most common, of all solar passive systems is solar architecture. Although generally considered to be one of the cleanest technologies, large-scale introduction of solar architecture may pose problems in cities where traditional architecture is an important element.

Other impacts might include constraints on property density, removal of tree shade, and the use of input material (e.g., insulators) that could present minor environmental problems.

Another passive solar technology currently used in a number of countries is the solar pond. Solar ponds require no input materials, but their use of land may be extensive, especially for large power generation systems, and there is the possibility of contamination of groundwater aquifers from saltwater ponds. Unlike solar architecture, there are virtually no secondary benefits related to solar ponds.

2. **Dispersed active systems**. These systems are based on the use of fixed orientation solar collectors, mainly for heating or cooling. Solar collectors are the most common technology for direct use of solar energy. All collectors are based on the capture and exchange of solar heat using heat-conducting materials.

The solar water heater is the best known application of the flat plate collector. It consists of one or several collectors, a means for storing the heated water, and control systems. Another collector application, space heating, increasingly is gaining acceptance. In these systems, collectors replace conventional heat sources by capturing the solar energy and transferring it to a heat distribution system. Collectors can also be used for space cooling and air conditioning.

The manufacture and use of active solar technologies have no serious negative environmental impacts. Those impacts generally associated with active technologies are the following:

- Concentrating collectors designed to provide heat for high-temperature applications might require large areas of land.

- In urban areas, the use of solar active systems would be limited because they are fixed in place and might be difficult to integrate with existing architecture. A potential environmental problem in the early stage of the cycle is the manufacture of active solar systems, which requires large quantities of materials per unit of energy provided (with related air and water emissions, and solid waste disposal), including fiberglass, steel, glass, and copper. Another potential source of environmental pollution is the disposal of cooling fluids and heat transfer liquids for large-scale cooling systems.

3. **Solar electricity technologies**. The two primary methods of transforming solar energy into electric energy are photovoltaic conversion and thermal conversion.

a) **Photovoltaic conversion**. In photovoltaic conversion, solar cells convert solar energy directly into direct current. Solar cells are made of semiconductor materials; when illuminated by sunlight, an electric current is generated inside of the cell. The electric current easily can be extracted by placing conducting contacts on the surface of the cell. Cells are usually interconnected electrically to form photovoltaic arrays.

Cells are classified according to material and type of fabrication process used. Single-crystal silicon, the most common material used, produces cells of efficiencies of about 10 percent. New technologies are capable of reaching efficiencies as high as 35 percent under ideal conditions.

The most significant environmental impact associated with photovoltaic systems can occur during the production and use of the devices. Fabrication of the cells requires the use of hazardous gases, some at volumes not currently employed by any other major industry. Handling and disposing unreacted portions of these gases may be a problem. Accidental leakage from storage, distribution, or processing could also present important risks for nearby communities or for the plant's work force.

Solid waste that has adhered to deposition chambers at the plant must be removed periodically. The quantity and quality of the solid wastes will fluctuate with production process, but disposal is an environmental issue to keep in mind.

Due to the nature of the fabrication process, other health hazards to the work force include electric shocks and biological contamination from RF plasma systems, and blindness and burning from laser beams. Installing or maintaining roof-top photovoltaic systems presents the risk of electrical shock. Even though the voltage level of these systems is usually very low, the current generated is strong enough to cause serious health effects, even death.

b) **Thermal conversion**. This process involves the conversion of solar radiation into electricity in a two-step process: first, solar radiation is converted to heat (thermal energy) by a solar collector system; next, the heat is converted to electricity with a heat engine. There are two types of thermal conversion systems: low temperature and high temperature.

In low-temperature thermal conversion, flat plate collectors raise the temperature of a heat transfer fluid to about 80 to 95 degrees centigrade. This heated fluid is then used in a heat engine cycle to drive a motor or a turbine. High-temperature thermal conversion systems achieve very high temperatures by concentrating the received solar radiation in a small zone. In the concentrating zone, the temperature is closer to that of conventional thermal power units. Consequently, high temperature fluids easily can be supplied and the heat energy from the sun can be converted into mechanical energy in a turbine, and finally into electrical energy via a generator.

Two different technologies have been tested: distributed receiver systems (non-modular) and central receiver systems (modular). In the central receiver system, a large number of heliostats (mirrors) are positioned so that incoming solar radiation is reflected onto a receiver, usually a boiler, where the heat is transferred to a fluid and then converted into electric energy in a turbine-generator. The distributed receiver systems use parabolic collectors to concentrate the heat.

Solar thermal plants do not release any air pollutants, except in case of fire or rupture of a valve, when byproducts from the fluids may be released. The most significant environmental impact is that solar thermal plants require large areas of land to be effective; these requirements will vary according to engineering and topography.

There are two major health risks related to solar thermal systems: reflected light and working fluids. Sunlight mistakenly reflected to a person from one of the mirrors in a heliostat field could cause blindness or serious burns. Another danger is the accidental release of heat transfer fluids.

From a global perspective, solar systems (in fact all active systems) may affect the earth's heat balance in two different ways:

- By changing the reflectivity or absorptivity of the earth, although this could only have major climatic consequences if it were decided to satisfy almost all of the world's energy needs with solar systems.

- By releasing large quantities of waste heat. This would only modify local energy distribution, as opposed to the global effects of carbon dioxide accumulation.

III. Wind Power

As far as the environment is concerned, wind energy conversion systems have several advantages over conventional fuels: They do not emit air pollutants or discharge water contaminants, and they do not produce thermal pollution or solid wastes. The potential adverse impacts of wind power are noise pollution, TV and radio interference, and disruption of animal habitats and flight patterns.

1. **Noise**. There are two major types of noise associated with wind converters. The first one, mechanical noise in the power transmission and conversion machinery (gearboxes, generators, etc.), is easily shielded. The second type, called aerodynamic noise, is caused by the interaction of the moving and static parts and the wind, and it cannot be reduced significantly.

Several studies that measured noise levels near existing wind systems have shown that the noise is audible at reasonable distances but does not present a health hazard to people living nearby. Even in a worst-case scenario (i.e., assuming the minimum acceptable distance between the wind system and the closest homes), noise levels will not cause any disturbance and can be greatly reduced (up to 300 meters) with a variety of techniques. The most intense noise created by wind turbines consists of frequencies in a spectrum outside the range audible to humans.

2. **Interference with telecommunication**. Metal rotors reflect electromagnetic waves in the same way airplanes reflect or scatter radar signals. When electromagnetic signals from TV and radio are transmitted through areas where wind systems are situated, complicated interference patterns can be generated. This problem can be minimized by careful siting of the wind system.

3. **Impact on ecosystems**. The operation of wind energy converters might prove dangerous to low-flying birds or insects, especially in sites where the density of flying birds is high, such as seashores or large lakes.

4. **Other concerns**. Large-scale operation of wind machines will require considerable areas of land. The visual impact of wind turbines and transmission lines also should be considered. Safety is a concern during construction and maintenance of converter towers, but the risk is common to the building of all tall structures. Finally, like solar energy, wind power needs back-up systems for storage of energy, with the associated risk of a chemical release.

IV. Ocean Energy

Oceans potentially can support energy systems that could provide large amounts of power. There are three main types: tidal, wave, and ocean thermal energy conversion. Of the three, tidal is the most developed, with systems in place since 1966, though its application is limited. Wave energy has severe site limitations, while ocean thermal has been the subject of much research and little development.

1. **Tidal energy**. Hydroelectric power derived from the motion of the tides is available only during lunar-solar tide peaks, which may not coincide with peak electricity demands. However, the tidal cycles vary in a highly predictable manner, and the resulting generating capacity could easily be factored into a utility dispatching plan.

Tidal dams are built across bays or estuaries to impound seawater in a basin. The enclosed basin is allowed to fill during the incoming tide, with part of the incoming flow passing through hydraulic turbine-generators. When the tide reaches its highest level, all gates and hydraulic turbines are shut down. The outgoing tide recedes, causing a height, or head, differential between the sea and the impounded seawater. When the head is sufficient, seawater from the basin is allowed to run out to sea through the hydraulic turbine-generators.

Two conditions are essential to harness the tides for power. First, the tidal amplitude must be large--several meters at the very least. Second, the coastal topography must allow the impoundment of a substantial amount of water.

If a plant is built near an estuary, and if heavy waterway traffic comes through, locks would be necessary, as would fishways and fish ladders if the estuary contains fish-producing streams. Additionally, any alteration in the flow patterns of the water will affect some link in the food chain, directly or indirectly. Other concerns are decreased dilution of solids because of reduced tidal exchange, thermal releases, and reduced dissolved oxygen concentrations because of decreased aeration rates.

The first tidal plant, generating 240 MW, was built in 1966 near Saint Malo, Brittany, France. Other, smaller units have been installed in the (former) Soviet Republic, Canada and China.

2. **Wave power**. The concept of extracting power from wave energy is not new, but it was not until the 1970s that a feasible design was developed. The energy and power from waves can be considerable. A typical mid-ocean point has approximately 1.5-meter waves every eight seconds, corresponding to a mean flux of wave power across a section of the ocean on the order of 10 Kw/m^2.

Several designs, both on- and off-shore, have been studied: moveable body, oscillating water column, and diaphragm. Each design envisions a large-scale cluster of conversion equipment to produce sufficient power.

Worldwide application will be limited by geographic factors, the economics of energy transport and distribution over large distances, and the inhospitable conditions of the open sea. Since there are no large-scale plants in operation, it is difficult to say precisely what adverse effects could result. However, wave power plants would not produce thermal discharges, air emissions, or changes in salinity.

The most direct impact is probably that a system would act as a "wave-breaker", altering the natural flow of the sea, with the potential for both good and bad effects. On the positive side, harbours near the plant could offer safer anchorage, even during storms, and shorelines would be better protected against erosion. Marine habitats would be better protected, enhancing the growth of organisms. On the negative side, the upper mixing layers of the sea would be disturbed, with resulting adverse biological effects. Large-scale plants could influence climate because they would interfere with both wind-driven oceanic circulation and with sea-atmosphere energy transfer processes.

3. **Ocean thermal energy conversion (OTEC)**. OTEC depends on a difference in temperature between the ocean surface and deep sublayers. Enough of a gradient exists in tropical and sub-tropical waters to support OTEC systems. The concept is as follows: cold, deep seawater is used as a condenser fluid; warmer surface water is used to heat a boiler containing a working fluid (usually ammonia or freon) of very low boiling point so that vaporization can occur under normal atmospheric pressure. The vaporized gas then passes through a conventional steam engine to produce power. The gas is then condensed in the condenser and pumped back to the boiler as a liquid for reuse in the cycle. In some systems, vast quantities of fresh water are produced.

No large-scale OTEC plants are in operation. Potential impacts include the following:

a) **Marine impacts**

- Effects of plant deployment and presence include biota attraction and repulsion. Plants would act as an artificial reef, providing habitats for extensive marine communities.

- Effects on seabed: mooring, pipe, and cable installation; site preparation effects.

- Effects of warm and cold seawater withdrawal: impingement, entrainment.

- Effects of plant discharges: ocean water mixing, nutrient and trace element redistribution, releases of biocide, working fluid, trace constituents, oil, dissolved gas.

b) **Impacts on climate**. Since huge flows of warm and cold water would be involved, there is concern that OTEC plants would cause local or even global weather modification. This has been discounted because such a threat would exist only if there were many OTEC plants operating around the world.

c) **Terrestrial impacts**. Construction, land use, disruption of animal habitats.

d) **Atmospheric impacts**. Sea surface temperature change; carbon dioxide release (this is not thought to be significant).

V. Waste Energy

Waste can be classified in four major groups: urban, industrial, agricultural, and forestry. Urban and industrial wastes include solid wastes from waste treatment facilities, and wastes such as oils, greases, and solvents. Agricultural wastes include crop residues and residues generated by the crop/food industry. Forestry wastes means residue from forest management and cutting activities.

1. **Waterwall incinerators**. Waterwall incinerators were introduced as a new technology to recover heat from conventional refractory incinerators. They utilize a set of closely spaced steel tubes welded together and attached to the furnace walls, with water or steam circulating through the tubes.

Emissions from waterwall incinerators include particulates, gases, wastewater from ash sluicing, bottom ash, and captured fly ash. Gases are mainly sulfur dioxide (SO_2), nitrogen oxides (NO_x), chlorides, carbon monoxide (CO), and to a lesser degree carbon dioxide (CO_2), oxygen, and hydrocarbons (methane and ethylene). Since the refuse burned usually has a much lower level of sulfur than coal, the SO_2 emissions generally will be significantly lower than those from coal-fired plants. Chloride emissions might be high, depending on the plastic content of the refuse.

Solid waste emissions consist of bottom ash and captured fly ash, and are usually dumped in landfills. Different technologies can be used for air emission control. Wet scrubbers have proved to be expensive and sometimes ineffective because they do not capture smaller particles. Electrostatic precipitators are now used in most incinerators, and some pilot baghouse programs have been developed.

2. **Hog-fuel boilers**. "Hog" is a compact form of lumber manufacturing waste. The waste, when mixed with varying percentages of sawdust and shavings, constitutes a "hog fuel", which can be burned like any other fuel or wood product.

Wood combustion byproducts include particulates, fly ash and bottom ash. Because of the low sulfur and nitrogen content of wood, hog burning should not emit significant levels of SO_2 or NO_x.

Multicyclones are the only particulate control technology used by most hog fuel boilers. Wet scrubbers can also be used effectively, since the particulate size from wood combustion is generally large. This may result, however, in secondary waste water pollution. Fly and captured ash can be disposed of in landfills.

3. **Combined firing systems**. Combined firing systems utilize refuse-derived fuel (RDF) or wood with coal or oil for power or steam generation from boilers.

If RDF is used with most any other fuel (e.g., coal, oil), the plant where the municipal solid waste is processed is the first emission source of the combined system. Emissions from such facilities can include solid residue from processing and particulate pollutants from the air classifier system.

Emissions from the power plants will depend on the type of combined firing system used. For example, when coal and RDF are used, emissions will include solids in the form of bottom ash and captured fly ash, air emissions in the form of particulates and gases, and boiler sluice water. The fly ash is characterized by a greater concentration of elements such as lead, antimony, and tin than that generated from coal burning. When RDF and oil are used, particulates (carbon and ash), NO_x, SO_x, and hydrocarbons will be generated, with levels of CO, CO_2, NOx, and organics similar to those from RDF/coal plants.

4. **Thermochemical (pyrolysis) processes**. Pyrolysis is a complex combination of chemical reactions in which thermal decomposition takes place under an oxygen-deficient environment. The exact chemical reactions are not entirely understood, but some of the products that the process generates include combustible gas, liquid, or solid, making pyrolysis potentially useful for a waste-to-energy system.

Emissions from pyrolysis systems depend on the specific process. The major pollutant streams can be air, solid, or liquid. Air emissions can include particulates and gases in the form of HCL, H_2S, NO_x, and mercury (Hg). The solids can contain undesirable leachates, and wastewater from pyrolysis systems can be high in biological oxygen demand (BOD), chemical oxygen demand (COD), alcohols, phenols, and other organic compounds.

Part B: Environmental Impacts of Production and Use of Biomass as Fuel

I. The Demand for Biomass Fuels

Biomass is derived from the process of photosynthesis, in which solar energy is converted into chemical energy and stored in organic matter. There is a wide range of products that can be regarded as fuels: trees and shrubs, grasses, algae, aquatic plants, organic wastes, fuel crops, agricultural and forest residues, and animal excrement. The most common biofuel is fuelwood. Other forms of biomass commonly burned as fuel, primarily in less developed countries (LDCs), include agricultural residues and dung cakes.

While biomass is an energy alternative for developed countries, it is an indispensable energy for most of the world's developing nations. It is the single most important source of energy for cooking and space heating in many LDCs, especially for the rural population. Fuelwood, crop residues, and animal manure are burned on a daily basis as a primary source of domestic fuel. On a global level, biomass provides 12 to 14 percent of the world's total energy consumption and accounts for one third of overall energy demand in the developing countries. In some LDCs biomass represents as much as 90 percent of energy consumption.

It is estimated that about half of the world's population relies on biomass fuels as a domestic fuel, with crop residues and dung representing 20 percent. The amount of fuel consumption for cooking is approximately 1 kg of air-dried fuelwood equivalent per person-day, or roughly 15 MJ net heat content. Fuelwood is often, but not always, considered the most important biofuel. For example, in the densely populated plains of northern India, Bangladesh, and China, dung (mainly in India) and crop residues provide as much as 90 percent of household energy in many rural communities, and a considerable proportion in urban areas as well.

In the developed countries biofuels are made up mainly of woodfuel. Other minor sources may include, for instance in the U.S., solid wastes (10%) and fuel alcohol (2%). Crop residues and animal manure play virtually no role. The major consumer of woodfuel in many developed countries is industry. The residential sector also consumes a sizable amount of woodfuel, primarily for space heating. The growing demand for biofuels in these countries is mainly due to the increased costs of oil since the first oil crisis in the early 1970s.

II. Environmental Impacts of Biomass Production

Five categories of biomass systems can be described: 1) silviculture and forestry; 2) agricultural crops; 3) livestock wastes; 4) freshwater systems; and 5) marine systems. The first three systems roughly correspond to the three biofuels of greatest concern on a worldwide basis. The major environmental concerns about the production of woodfuel and forest residues, agricultural residues, and animal dung will be reviewed in this section.

1. **Woodfuel and forest residues**. The world's forest resources are being depleted at an alarming rate. The major causes for forest depletion are agricultural expansion and woodfuel shortages in many LDCs. It is said that of all the trees cut down in the world half are used for cooking and heating. Overcutting trees for fuelwood over the long term will contribute to deforestation, which in turn will cause floods, siltation, desertification, and changed global cycles of carbon and other elements.

Harvesting forest biomass and removal of forest residues may adversely affect soils and nutrients. The effects on aquatic environment involve hydrology and water use, water quality, and aquatic biota. Water quality, for instance, could be affected by sedimentation, logging debris, and nutrient release. There could also be changes in forest habitat due to the removal of slash, culltrees, and snags.

2. **Agricultural residues**. When crop residues, such as straw, stalks, and leaves are returned to the fields, they have many soil conditioning functions: retaining plant nutrients; keeping soil porous and in condition for easy tillage and good plant growth; increasing infiltration of water into the soil and water storage; reducing soil detachment caused by wind and raindrop impact; and reducing velocity of runoff and associated soil transport potential. Excessive removal of crop residues for fuel recovery will expose soils to increased wind and water erosion. The loss of nutrients from residue removal will also require more inorganic fertilizer use.

The use of crop residues as fuel may not necessarily have a direct impact on soils and nutrients, since non-combusted residues are not always returned to the fields. Residues generated at large crop processing facilities also are generally not recycled. Some residues are hard to recycle and may, like cotton and tobacco stalks, pose a hazard if left to rot in the fields. Estimates of the proportion of crop residues that can be removed without causing adverse effects vary immensely from 20 to 66 percent based on site-specific factors. One way to recover the nutrient loss from residue removal is to return ashes to the fields after burning.

3. **Animal dung**. The use of manure for fertilizer is not economically feasible in developed countries, and using it as fuel is simply unthinkable. In many LDCs, however, animal manure is not only used as fertilizer, it is burned as a domestic fuel

as well, and the demand is quite high in some regions. However, using animal dung as fuel instead of recycling represents a great loss of nutrients in soils. One ton of animal dung has been estimated to increase grain yields by 50 to 60 kg if applied in the fields. Moreover, as in the case of crop residues, the loss of nutrients has to be compensated for by using more chemical fertilizer.

III. Environmental Impacts of Biomass Combustion

Studies on the impacts of direct biomass combustion mainly deal with air pollution impacts on human health. In developed countries biomass (i.e., wood) is burned in metal stoves or fireplaces for space heating. Smoke and other emissions from the combustion are released outdoors to the ambient air. Studies performed so far in the U.S., for instance, have dealt with emissions from large, centralized sources and from residential wood combustion (RWC) and their impact on the local air quality. On the other hand, the principal use of biomass in the LDCs is for household cooking, as well as for space heating, particularly in rural communities. The stoves are generally very simple and without flues, in many places consisting of little more than a three-stone open fire. Moreover, people in the LDCs, especially women, spend a considerable amount of time every day on household cooking. As such, biomass combustion poses a serious problem of indoor air pollution for women and infants accompanying them.

Emissions from biomass combustion depend on the interaction of many factors, such as particle size, moisture content, temperature of combustion, air-to-fuel ratio, size and shape of the combustion chamber, and mineral content of the feedstock. The size of the units and the scale of combustion also determine the amount of emissions and their impacts.

The principal pollutants of biomass combustion are particulates, carbon monoxide, hydrocarbons, and, to a lesser extent, nitrogen oxides. Very little sulfur oxides are emitted compared with coal.

Although air quality studies in the U.S. typically deal with the impacts associated with large, centralized emission sources (note: some recent studies have addressed RWC), the greatest impacts on ambient air quality would result from small, poorly controlled units. The higher emission factors in residential-scale stoves result from incomplete combustion. A variety of chemical compounds are generated during wood combustion, including:

- 17 priority pollutants, which combined account for 4.8% of the particulate mass;
- up to 14 carcinogenic compounds making up 0.5% of the particulate material;

- 6 cilia-toxic and mucus-coagulating agents;
- 4 co-carcinogenic, initiating, or cancer-promoting agents.

There have been several experimental studies in the U.S. of emission factors from wood stove combustion. Studies of environmental impacts of RWC are concerned with the local ambient air quality. Accordingly, control technologies that reduce RWC emissions are aimed to improve the ambient air quality or to attain acceptable levels of emissions required. The characteristics of wood burning are very site-specific and stove specific.

IV. Control Measures for Biomass Burning

Control technologies on biomass burning are not widely available or feasible for small-scale, residential use. Flue gas scrubbers of thermal power plants and catalytic converters in the automobile exhaust systems are technically applicable to biomass stoves, but the high cost and inconvenience impose constraints on their adoption by residential users.

Another control method of flue gas treatment is to force flue gas through soil beds. This method can remove all detectable smoke, odor, and polynuclear organic matter (POM), up to 97% of CO, and at least 97% of the SO^2 from flue gases of wood and coal combustion. The technique is also said to be "low cost, reliable, almost maintenance-free, and also appears suitable for other small point sources of air pollution".

Most stove technologies developed for the LDCs are the so-called "improved stoves." The improvement, if any, is generally made in energy efficiency in order to cope with fuelwood shortages, rather than to address air pollution problems. More efficient stoves, however, do not guarantee fewer emissions, even in terms of unit useful heat produced.

There are many factors affecting the types of emissions and emission factors. The current understanding of those factors is still inadequate and inconclusive. Although mitigation technologies for biomass burning viable for LDCs do not seem to be available, it is important to continue research into the characteristics of biomass combustion and factors that affect emissions so that "better" fuels are burned and less polluting stoves can be designed and disseminated.

Notes

1/ Adapted from "Energy and Environment: Impacts and Controls", UNDTCD Energy Series Report TCD/NRED/E.16, October 1990.

Note on
Sources of Funding
for
Environmentally Sound and Sustainable
Development Projects

(Agenda item 11 of the Provisional Agenda)

United Nations Department of Economic and Social Development

I. INTRODUCTION

With the completion of the United Nations Conference on Environment and Development, donor countries, international financial institutions, international organizations and other funding sources, are putting increased emphasis on environmentally sound and sustainable projects. Funding for such projects, particularly those that feature the role of "major groups" such as women, will most likely receive priority consideration in the years ahead.

The purpose of this paper is to indicate some of the main sources of finance to which well-conceived and sound projects may be submitted for support. Every funding source has its own criteria for approving funds. Project proposals have, in general, to be negotiated on a case by case basis. In-depth treatment of the wide variety of funding sources available would not be possible in a report of this scope and length. Notwithstanding the obvious limitations, it is hoped the present report will provide a useful guide for those not fully familiar with the international funding system.

II. BILATERAL SOURCES OF FUNDING

A. Overseas Development Assistance (ODA)

Overseas development assistance represents the total of all financial resources in the form of loans, grants or credits provided by donor countries either through bilateral or multi-lateral channels to developing countries. The amount of ODA is usually calculated as a percent of the GNP of donor countries. Much of the discussion on financial resources at the Earth Summit focused on reviving a 20-year old commitment by the rich countries that ODA should represent 0.7% of their respective GNP's. Very few countries, with some notable exceptions, have achieved this goal. A serious effort to achieve this level of funding would represent a substantial increase in the availability of new and additional financial resources to support environment and development projects.

B. National Governments

The main source of ODA as well as the main channel of its distribution is national governments. Most, if not all, major donor countries have bilateral funding and technical cooperation agencies through which bilateral ODA is channeled. Typical examples are USAID, DANIDA, FINNIDA, the British Overseas Development Administration, Swedish Agency for International Technical and Economic Cooperation and the German Bundesministerium fur Wirtschaftliche Zusammenarbeit. Most bilateral funding is provided on a government to government basis, although there are cases where bilateral funding agencies do provide funds to NGO's and other private organizations to conduct certain types of projects and programmes in recipient countries. The best guide for dealing with bilateral funding sources would be to contact the respective agencies. It should be borne in mind, however, that much of the bilateral funding may be linked to the national policy objectives of the donor country. Hence, while one donor country might, for example, favor a project on family planning, another donor country may not. Determining the policy preferences of particular bilateral donors may be a key to obtaining funding for a project.

C. Private Foundations

Europe, the United States, Canada and several other developed countries have many private research and charitable foundations that provide funding for a wide range of research activities and pilot demonstration projects as well as the training of personnel. Well known examples in the U.S.A., include the Ford Foundation, the Rockefeller Foundation and the Carnegie Endowment. Very often, these foundations are prepared to provide financing for novel and innovative projects that would not normally be funded by the bilateral aid agencies of major donors.

D. Non-Governmental Organizations

There are a long list of non-governmental organizations (NGO's) concerned with environment and development issues. Some of these are accredited to the Economic and Social Council (ECOSOC) of the United Nations. Others were accredited to UNCED while still others operate outside orbit of the United Nations. NGO's range in size from a two person, single room office to those with thousands of members, large budgets and considerable influence with policy makers in various countries. NGO's such as Greenpeace and the Sierra Club usually have a political, economic or social agenda and tend to devote their resources to the furtherance of that agenda. There are NGO's who do finance projects of well defined scope and usually small budgets. It is difficult provide any general rules or guidelines because each NGO is unique and is pursuing different objectives. A search for financial support among the NGO's would require a project by project and NGO by NGO approach to match likely projects with likely sponsors.

II. MULTI-LATERAL SOURCES OF FUNDING

Most major donor countries provide a portion of their ODA through multilateral institutions such as the United Nations system of agencies. Among the more prominent of the multi-lateral institutions are the following.

A. United Nations Development Programme (UNDP) 1/

UNDP receives and administers technical assistance funds provided as voluntary contributions from donor Governments. The aim is to support developing countries by providing systematic and sustained technical assistance related to the country's own plans and priorities. In recent years, UNDP has given increasing attention to environmentally sound and sustainable assistance.

Projects are implemented through the provision of funds to either (1) an executing agency of the U.N. system such as FAO or DESD, (2) a recipient government under a scheme called Government Execution or (3) UNDP's own Office of Project Services (OPS).

UNDP maintains a country office in most developing countries which is headed by a Resident Representative or Resident Coordinator who is responsible for the preparation of UNDP programmes and projects and who provides overall coordination for the technical cooperation programmes of the U.N. system as a whole.

UNDP administers several different sources of funding.

B. The Core Programme (IPF)

The total financial resources available to UNDP for distribution are divided between country programmes and intercountry programmes. Each country is assigned an "indicative planning figure" or IPF which represents its portion of UNDP resources available to be programmed. The IPF figure for each country is based on several related indicators of development. The intercountry programme consists of global, interregional, regional and sub-regional projects.

1. Special Programme Resources (SPR)

SPR has the objective of strengthening and supplementing activities in those areas funded by the IPF. SPR funding complements the resources available within the country IPF's. SPR is a general fund available to all countries, but not allocated to individual countries. SPR is seen as a catalyst to ensure that other UNDP resources achieve the objective of building national capacity. In the field of the environment, SPR funds are supposed to:

a. support the formulation of environmental plans and policies and strengthen institutional and technical capacities;

b. better equip individuals with the skills needed to make informed choices about the environment; and,

c. support global, regional and special environmental initiatives.

2. U.N. Development Fund for Women (UNIFEM)

UNIFEM channels financial and technical resources to developing countries to support women's economic activities and to stimulate a larger share of mainstream development resources for programmes that include women. Special consideration is given to rural and poor urban women in least developed, land-locked and island developing countries.

UNIFEM has been an autonomous body in association with UNDP since 1 January 1986. Resources come from voluntary contributions by governments, organizations and individuals. The Fund undertakes programming missions and works closely with UNDP in the identification and implementation of projects. The UNDP resident representative/coordinator represents UNIFEM in the field.

3. U.N. Capital Development Fund (UNCDF)

The resources of the fund consist of voluntary contributions, cost-sharing contributions and project specific trust funds. The Fund provides small-scale capital assistance in the form of grants or long-term loans on concessional terms. It give special attention to low-income and other vulnerable groups.

4. U.N. Sudano-Sahelian Office (UNSO)

UNSO assists the drought-stricken countries of the Sahel and its regional organizations in drought recovery and rehabilitation. It has a major role in implementing the "Plan of Action to Combat Desertification. The great majority of its resources are in the form of cost-sharing and project-specific trust-fund contributions. In addition, special resources are earmarked ny UNDP and UNEP to finance a portion of the costs of the Joint Venture to Combat Desertification.

5. U.N. Revolving Fund for Natural Resources Exploration (UNRFNRE)

The Revolving Fund provides financial and technical assistance in all phases of natural resources exploration where high risk capital from other sources is not available. Special attention is given to the needs of Least Developed Countries

(LDCs). The resources of the Fund consist of voluntary contributions pledged for the Fund and such other financial resources as may be generated through whatever is discovered or produced with the Fund's assistance. In recent years, the resources of the Fund have not be adequately replenished.

6. U.N. Volunteers (UNV)

UNV provides developing countries with low-cost, mid-level expertise under volunteer conditions of service. The programme has been given special responsibilities for youth and domestic development services. The UNV Special Voluntary Fund receives contributions for the external costs of volunteers from developing countries.

7. Special Measures Fund for LDCs (SMF/LDCs)

This fund was established to increase resources for LDCs available through UNDP and to provide a convenient funding channel for donors wishing to allocate resources specifically for these countries. Contributions to this fund do not form part of the central resources of UNDP, but the Fund is integrated into UNDP for use in particular programming activities.

SMF financing is concentrated in two broad areas. The first is for national capacity building in such areas as policy reform, development planning, needs assessment and human resources development strategies. The second seeks to strengthen non-governmental economic activity such as grass roots programmes and income-generating activities in the rural sector.

8. Short-term Advisory Services (STAS)

The STAS programme helps developing countries meet pressing needs for top-level technical and managerial advice which may not be available from other sources. STAS adviser are made available on request to developing countries for short-term assignments at minimal cost.

9. Technical Cooperation Among Developing Countries (TCDC)

TCDC activities and projects involve the voluntary sharing or exchange of technical resources, skills and capabilities between two or more developing countries. Such activities assist governments, in collaboration with UNDP and other U.N. agencies, to undertake TCDC programmes. UNDP has a promotional and co-ordinating role within the U.N. system for TCDC matters. UNDP maintains a TCDC Information Referral System in New York.

10. Special Trust Funds

These trust funds are established for specific purposes in which donor countries (either developed or developing) show interest. They can be to support a particular project or activity in a country. The specified purpose must be consistent with the policies, aims and activities of UNDP. If the establishment of a trust fund involves net additional financial liability for UNDP, directly or indirectly, the proposal to establish such a fund must be submitted to UNDP's Governing Council for approval.

11. UNDP Energy Account

The UNDP Energy Account helps developing countries, particularly the poorest, develop and efficiently use their energy resources. The Energy Account depends on voluntary contributions and co-financing of programmes and projects with other donors or IPF funds. Special emphasis is given to harmonizing activities with the UNDP country and intercountry programmes. The Resident Representative acts as the representative of the Energy Account at the field level.

12. U.N. Fund for Science and Technology for Development (UNFSTD)

UNFSTD provides technical and financial assistance to promote international co-operation for strengthening the scientific and technological capacities of developing countries. Resources are derived from voluntary contributions pledged to UNFSTD and through co-financing for specific projects. Policy guidance is provided by the Intergovernmental Committee on Science and Technology for Development.

13. Transfer of Knowledge Through Expatriate Nationals (TOKTEN)

TOKTEN brings highly skilled and experienced expatriate professionals in a variety of advanced fields back to their countries of origin for short-term consultancies. TOKTEN experts volunteer their services while UNDP pays for travel and daily living expenses.

C. The World Bank (IBRD)

The World Bank has traditionally provided loans for all types of infrastructure projects such as roads, railways and power facilities, agriculture and irrigation among others. Its more recent development strategy places more emphasis on investments that can directly affect the well-being of poor people by making them more productive and by bringing them into the development process. Most recently, the Bank has increased its emphasis on projects with an environmental dimension.

The Bank extends long-term loans to credit-worthy countries and charges an interest rate that is related to the cost of funds raised in the market. The Bank is required to ensure that the proceeds of each loan are used only for the intended purpose. The Bank is prohibited from making "tied' loans, i.e. it cannot impose any conditions requiring the proceeds of its loans to be spent in any particular member country. The Bank's decisions depend primarily on economic considerations.

1. International Development Association (IDA)

The IDA is what is called the "soft loan window" of the World Bank. Its purpose is the same as the Bank, but it provides assistance on terms that bear less heavily on the balance of payments of developing countries. Its assistance is concentrated in the poorest countries. In keeping with the directive to be more flexible, virtually all IDA development credits have been for a term of 50 years and have been interest free. IDA lends for the same purposes as the Bank, i.e. for capital infrastructure, transportation, electric power, telecommunications, irrigation and flood control, but also for assisting the rural and urban poor through loans designed to improve living standards and productivity.

2. Global Environment Facility (GEF)

The GEF is a three-year pilot programme to provide grants and low-interest loans to developing countries for environmental management related to four major areas:

- Reduction and limitation of greenhouse gases
- Protecting biological diversity
- Protecting the Ozone layer
- Protecting international waters from pollution

The Fund (over US$ 1 billion) was established in November 1990 based on monies provided by several donor countries. The fund is co-managed by the World Bank, UNDP and UNEP.

A work programme for GEF was approved in April 1991 which included 15 projects valued at $214 million. These projects are to be approved by the Participants (donor countries) by the end of 1991. Of the 15 projects provisionally approved 11 are for biodiversity, 3 for global warming and 1 for international water pollution. The approvals comprise both investment and technical assistance projects.

The criteria for project approval include the following:

a. GEF funds are additional to regular assistance;

b. Projects must relate to one of the four specific areas;

c. Only nations signing the Montreal Protocol are eligible for GEF ozone protection funds;

d. UNDP, the World Bank and UNEP review each proposal for GEF financing;

e. Projects should contribute to understanding global environment problems;

f. The project would not otherwise be funded or viable without GEF support;

g. The Gross Domestic Product (GDP) of the recipient country must be at or below $4000. per capita as of 1989;

h. GEF funds should complement but not substitute for other types of funding - cost sharing is accepted;

i. Projects must be compatible with global environment conventions;

j. Projects will be evaluated on their likely physical effectiveness and benefits rather than financial benefits;

k. A project to be feasible must result in sustainable long term benefits;

l. The project should promote institutional capacity building, appropriate technology and local community involvement;

m. Projects should increase the leverage of GEF funds by mobilizing other types of funding.

Already plans are being laid to expand the scope and functioning of the GEF as a result of criticisms that emerged during the UNCED process. Among other issues, it is proposed that the GEF be made more democratic, transparent, universal and accessible to all countries and that its area of operation and mandate be expanded beyond the four areas outlined above. In time, it may very well become the "green fund" that many countries hoped would be established.

D. Regional Development Banks

Regional Development Banks operate along lines similar to those of the World Bank but focus their lending activities on their particular regions of the world. Each Bank has its own rules and regulations and modes of operation. Some typical regional institutions include the:

African Development Bank
Arab Fund for Economic and Social Development
Asian Development Bank
Central American Bank for Economic Integration
Caribbean Development Bank
Inter-American Development Bank

E. Specialized Agencies of the United Nations 2/

The Specialized Agencies of the U.N. system such as FAO, WHO, UNESCO, WMO, etc. all have "regular programmes" of technical cooperation and support for developing countries. In some cases, these regular programmes have more resources than the funds which the Agencies receive to carry out UNDP funded projects. In other cases, regular programme funds are smaller and are used primarily to prepare pilot type projects that may stimulate the flow of financing from other sources.

Notes

1/ Information on UNDP based on relevant sections of UNDP's Programme and Projects Manual (PPM).

2/ Although DESD is not officially a specialized agency, it carries out the second largest programme of technical assistance in the system based on UNDP project funding. DESD also has a small regular programme the funds of which are used as seed money to prepare new or innovative type projects.

B. CASE STUDIES *

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* The case studies presented by participants, which have been only minimally edited, reflect the views of the authors, and do not imply any opinion whatsoever on the part of the United Nations.

Coastal Area Management in Bangladesh

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The existence of Bangladesh is threatened by significant environmental degradation, resulting in climate change, increasing cyclonic activity and severe and frequent flooding. Bangladesh should be taken as a case for survival against environmental stress of the most dangerous kind through no fault of her own. The most vulnerable victims are women and children. It is a challenge for the global community after the UNCED 1992, to achieve ecologically sustainable development. Our oceans have become the biggest dumping grounds for pollutants. Oceans cover 70 per cent of the earth's surface and play a critical role in life-support systems of the world in terms of climate change, and in sustaining animals and plants. Yet the importance of protection of the marine environment for the world community or coastal states remains relatively negligible.

By the end of this century we may need over 26 million tons of cereal. At the present rate of production we shall require 16.8 million hectares of land to produce this amount of food. With double cropping, this will require 8.4 million hectares. That is the total arable land of Bangladesh. What about other essential crops and livestock, fisheries and forest resources? At the present rate of consumption, one million additional tons of fertilizer will be needed which will require precious foreign exchange. The sustainability of land will be overly stressed. Bangladesh could well be perceived as an example of "beyond the limits" - in a state of collapse, which reflects the kind of prediction being made by the prestigious Club of Rome. While we can never achieve an ideal population for sustainable support of our country, there will be a massive exodus of human beings; a kind of convulsion, both social and political, may bring about total break-down.

Life began at sea, and life on earth is dependent on water. Although the oceans have not been fully explored and studied, as compared with other coastal countries, the study of the ocean in Bangladesh has been ignored for too long. The coastal area itself is neglected and underdevelped. It covers almost a fourth of the total area of the counry including over one hundred Upazillas. One fourth of the total population of Bangladesh live here. The land area is around 13 thousand square miles. To this it we add another 40 thousand square miles of the Economic Zone in the Bay of Bengal the land becomes potential for providing resources badly needed in this overcrowded and over exploited country. The present human resources to this potentially rich area has never been studied in any detail.

Our land is limited and Bangladesh is one of the most thickly populated country of the world with more than 116 million population with 50 per cent of the population under the age of 15.

According to 1981-82 data, 87 per cent of the rural population of Bangladesh live below the nourishment line and 65 per cent eat half of their bodily requirement. Ninety per cent of children below the age of five suffer from malnourishment-related ailments and 15 per cent are severely mainourished. There are no separate data available for the coastal area population but the rate of mainourishment was the highest among the coastal population. Frequent flood, crop loss, water logging, salinity,less opportunity for work and increasing cyclonic activity and storm surges made population of the coastal belt more vulnerable than the rest of the country.

As land becomes scarce due to increase in population and overexploitation of land resources, we must look to the sea for food and other resources. Other coastal nations have developed the science of the oceans and prospered. Bangladesh can no longer ignore doing the same for two reasons: first, in order to meet the challenge of a growing population on limited land, we need to exploit the seabed resources which can supplement our basic needs. Second, the new Law of the Sea establishes a 200-mile Exclusive Economic Zone and gives exclusive management authority to the coastal state for conservation and exploitation. This indeed places certain obligations on us as a coastal state.

Coastal areas constitute a vital part of Bangladesh's frontline struggle against environmental degradation. A substantial number of poor people inhabit these regions. This makes it imperative to develop the action programme of preserving and protecting the coastal environment on a sustainable basis. Preservation of the Sunderbans mangrove, for example, will need mobilization of substantial resources on an international scale. Ensuring a better quality of life for the people inhabiting the coastal area will require international assistance as well as internal resource mobilization.

The Sunderbans, the largest compact mangrove ecosystem of the world, covering more than 6,000 square kilometers, supplies vital elements of life which we fail to appreciate. Its unique flora and fauna and genetic diversity comprise an important gene pool for mankind. Like many tropical forests, its role as a CO2 sink and in keeping the climatic balance is well known. It provides habitat for a wide spectrum of threatened wildlife. During the last 100 years, the Sunderbans has lost 18 species of animals, but surprisingly, 14 of these in the last 20-25 years. It is the largest and only viable Tiger Sanctuary of the world.

The Sunderbans represents a dynamic yet fragile and complex ecosystem which balances with natural elements such as soil, water and environment. The resources of the mangrove are critically linked to the land and water management practices in the catchment areas upstream and near-shore coastal areas. Increasing human intervention in the upstream and within the area have put this ecosystem under the threat of severe environmental stress. Marine pollution now treatens this ecosystem. To meet the immense challenge of balancing economic demand against the environmental realities of the resource-limited areas of the world, the international community has a responsibility to assist and ensure that resource use is sustainable and the degradation of the environment is halted. Coastal areas should be protected from dumping of hazardous toxic wastes, unprocessed industrial effluents in the estuaries, oil pollution from spill, and port and shipping activities. International cooperation should be sought to protect the sea from oil spill offenders, to develop technologies to protect and make sensible use of the biological resources of the Bay of Bengal.

It is urged upon the Government of Bangladesh to sign and implement all international conventions related to environmental protection of marine and coastal areas.

Ecological and hydrodynamic balance is dependent on fresh water supply from upstream reaches. The increase in salinity in the southwestern region is the direct result of the reduction of fresh water supply resulting from the Farakka Barrage. Attention should be paid to upstream development so that the quantum of fresh water supply to the estuary is maintained and so that the balance is not disturbed. Regional cooperation is essential for achieving these goals.

For the improvement of the quality of life of people living in the coastal belt and also for the management of cyclone and storm surge disasters, it is imperative that an integrated programme of coastal embankments, cyclone shelters, coastal afforestation, road and jetty construction, and land and water management in the coastal belt, be developed. Improved communication, particularly with the offshore islands, is essential for development, as well as for efficient disaster management.

Half of the country's population comprise women, and 80 per cent of these are rural and live below subsistence level. Yet they are a potential under-utilized force. Some of them are highly skilled in handicrafts. Yet many are unable to manage the burden of feeding and looking after entire families because of poverty, ill health or environmental disasters such as floods and cyclones which have now become annual occurrences. We are trying to focus on this group of women who are skilled and need help. By mixing middle and small business women, we are offering an exchange and a partnership which we believe would be mutually beneficial.

In the coastal area, I discovered a potential group of women and worked closely with them with the attitude that if a woman has skills or can be taught easily, has gained natural managerial skills by surviving against all odds, has products with a market but has no capital or collateral, is provided a loan, capital, marketing facilities and other opportunities, she will not only thrive as a self-reliant person but she will also be able to offer employment and examples to other women with less opportunities.

This is a target group, "NARI", which means in Bengali women reached out to help. We first experimented this in 1988 in a fund-raising handicrafts bazaar where successful business women and small village entrepreneurs assembled.

What was exciting was that women met and talked business. NARI members from a small village in Noakhali who did not speak a word of English and have never left their village, sold all of their magnificient grass mats or "pati" and even made business contacts with the leading handicraft emporiums in the city. Today they are the main suppliers of "pati" in the capital. A group of dynamic Japanese women who run the Third World Shop in Japan have ordered these wonderful natural mats - useful as beach mats or floor mats, or as bed covers which wash easily. Today these grass mat-making women have driven out plastic mats from local competition. The women have planted these special grasses in their backyards or wherever they can, so that they can save money. NARI has encouraged them to plant trees and use designs from nature in order to encourage environmental consciousness among them and their clients.

The 1991 cyclone which struck the coastal area of Bangladesh and left thousands of women and children homeless and in great misery has also marred our activities and affected many of our members. The mat project in Noakhali, which is directly in the cyclone belt area, was particularly affected.

What they needed most was a stronger and larger working place where they could gather day and night and work together. I have been able to provide electricity, a television set, a sewing machine and some roof tin. We also learned that our joint tribal Jummobi-Nari textile project was badly damaged by the cyclone. With generous help from the Government of France, NARI has built two working places in Noahkali and Chittagong Hills Tract for the women involved in our projects. They now have their own working place which is more solid than their own homes and they run the places themselves. A programme in integrated health care, safe motherhood, family planning, informal education and training from our own modest local resources is serving many women and younger women, who would not otherwise have had such opportunities.

In Chittagong Hill Tracts, NARI assists Jummobi, a tribal textile project headed by NARI member Kanak Chapa Chakma and her family, who run handlooms on which many Hilltracts women depend. The products are colourful and among the most beautiful. This centre could serve as a handicrafts centre from the Chittagong side. In Noakhali, the existing NARI Pati project could serve as a sub-centre for the coastal area. Both the centres produce potential exportable handicrafts and provide jobs for very poor women, and they contribute to environmentally sustainable development.

Since the floods of 1974, the members of NARI have been out in the disaster prone areas rendering our modest services which have earned for us good will as women crisis managers. We have quietly served during almost all the major disasters, contributing from our own modest resources. This has brought us the greatest satisfaction and brought together a team of women leaders with diverse interests and affiliations who take time out of their many social committments to serve for a common purpose - women.

NARI is initiating a "Save Our Gardens" movement. As a first step, NARI wishes to contribute towards the development of an ancient garden called Balda Garden. In a city of of more than 6 million inhabitants, where more than 60 per cent of the original greenery has been lost to development, roads and slums, Dhaka sould use some gardens.

This year, NARI engendering a general awareness concerning better and more sensible methods of garbage disposal, to encourage the separation of household garbage, and to have individual compost whenever possible, to increase a nation-wide awareness on garbage and industrial effluent disposal and to create a greater awareness of the environment and involve educated urban women in conservation issues.

This year we adopted a project for an integrated informal education program for women and very young women in a slum in Shantinagar, Dhaka.

Conclusion and recommendations

1. Bangladesh's coastal ecology is fragile and any intervention must be done with utmost care.

2. There is a need for a comprehensive coastal development plan based on the principles of sustainable development.

3. The systems properties i.e. productivity, stability, sustainability and equity would have to be considered before decisions are made about changes in land use and agro-ecological practices. Rigorous Environmental Impact Assessments must be undertaken on all major projects, and simplified EIAs should be undertaken for all projects in the coastal area of Bangladesh. The role and involvement of women in project design and implementation must be ensured.

4. Women's perceptions and participation would have to be taken into consideration prior to the implementation of projects.

5. As Bangladesh is one of the most likely areas to be affected by the greenhouse effect, the country should undertake studies to evaluate the impact and consider mitigation measures. This issue should be raised in all international fora and awareness should be increased in Bangladesh amongst planners and ordinary people alike.

6. A hazard management strategy (HMS) should be developed with efficient forecasting, early warning, dissemination, preparedness on floods and cyclones and a management strategy for coping with the hazards and the rehabiliation phase. People's perceptions and participation would have to be adequately considered in all aspects of such a strategy.

7. The areas of environmental concern with regard to the Bangladesh coastal area are: (a) overexploitation of Sunderbans; (b) industrial and marine pollution; (c) sedimentation, particularly its impact on navigation and ports; (d) overexploitation of Coral island and newly formed islands; (e) shrimp farming and its impact on soil fertility; (f) the major potential land reclamation projects and their environmental impacts; and (g) hazard management.

8. The need for a better understanding of the interaction and causal relationships in the Bangladesh coastal ecosystem is paramount. Thus, studies would have to be conducted with a multidisciplinary approach on the issues mentioned above, including physio-chemical, geomorphological, biological, socio-economic and ecological parameters, and also on people's perceptions of their needs, of the environment and of strategies for coping with hazards.

In the past, the coastal area offered a number of sea-faring activities, including boatmaking which made the men brave the world's oceans, trading first with the SAARC countries and later with ASEAN. They left their women and children behind in their homes, protected from cyclone, storm surges and floods only by the coastal mangrove forest which extended along the entire coastal belt, and their homestead forests. The protective coastal mangrove has been eroded for want of adequate energy supplies, ill-planned shrimp cultivation and human encroachement. People from the mainland who have lost everything from river erosion or drought, come to live in the coastal area without any experience of how to live with coastal hazards. It is this group of poor people who are killed by hundreds when cyclonic surges wash out the shores. There is increasingly no fuel or fuel substitute, and less fresh water, and more and more people die of water-related diseases. It is this challenge of bringing down the mortality and morbidity rates of women and children under environmental stress which should provide guidelines for an integrated coastal sustainable development. Poverty alone does not degrade the environment - it is the degraded environment which increase the poverty and misery of people.

The Role of Women in Environmentally Sound and Sustainable Development (The Bolivian Perspective)

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Bolivia: General information

Located in the center of South America, Bolivia shares boundaries with Brazil, Paraguay, Argentina, Chile and Peru. The most outstanding physical feature of the country is the contrast between the cold Andean region and the warm lowland in the eastern part of the country.

The Eastern plains occupy three fourths of the country's territory extending up to Brazil's Amazonian region and the Paraguay Chaco. At the western area, Bolivia belongs to the orographic system of the Andes Mountains.

Bolivia is a Unitarian Republic, enjoying a democratic political system established 10 years ago, after a long period of non-elected, authoritarian military governments, and politically unstable regimes. Its multicultural background and diverse productive structure are the most important features of Bolivia's social and economic.

Since 1985, and after dramatic economic crises (more than 20,000 per cent inflation rate per year and a negative growth rate in all areas of economic activities) Bolivia is facing a profound structural change in its economic structure. From that standpoint, the Goverment is encouraging the transformation of an economy based on state capitalism into a socially oriented, free market economy. In 1991, Bolivian growth was 4 per cent , with a total investment of $US 797 million; 201 million more than in 1990, overcoming a year of negative and low growth rates.

The basic element of Bolivia'a macroeconomic policy has been to maintain economic stability as a unique foundation of any forcoming growth. A clear investment strategy has been established promoting a change in the productive structure of the country and increasing the rate of public investment in basic infrastructure.

Inspite of the Government's efforts, Bolivia is still one of the lesser developed countries in the region. Bolivia must to improve living conditions and decrease a chronic poverty in which, an increasing number of Bolivians live.

Women and men in Bolivia

Preliminary 1992 census data report that Bolivia has over six million inhabitants. Women represent 51 per cent of the national population. Some 58 per cent of the population live in urban areas, showing a steady urbanization process. Official data during the the 1980s reported that out of 10 illiterate in the urban areas, seven were women, and out five illiterate in the rural areas, four were women. The mortality rate in 1990 for mothers was 48 for every 10 thousand. Inspite of the crisis, the number of women incorporated in the labor market has been striking, twice and three times above the growing rate of the economically active male population.

Despite the different positions held by women in the production and in the sphere of family reproduction, they suffer a general state of subordination. Although important laws on behalf of women exist in the statute books, in day-to-day practice, women continue to suffer discrimination and subordination in all spheres of Bolvian society . On the other hand, and despite recent achievements in the official data system, the underestimation and invisibility of women's actual contribution to the economy is even more evident in the rural areas and in the informal sector.

Rural women suffer the burden of this crisis in the family system and in the agricultural ("minifundio") production system. In the urban context, the presence of lower class women in the tertiary sector of the economy is striking, becoming more acute in the global context of the social and economic crisis. As in other third world countries, women adopt multiple survival strategies in order to help sustain the maintanance and reproduction of human capital.

Recent research testifies to the existing contradictions and the lack of correspondence between the social and economic role played by women and the recognition given to them by the family and by society as a whole. On one hand, women play multiple roles in their economic practices and, on the other, they are prevented from attaining gratification and power.

The global situation of women is beginning to be taken into account within sectoral public policies. Today, educational policies, programs and projects pay attention to women's needs in this field. In the health sector, public plans of action are accomplishing their goals of reducing the mother-child mortality rate.

Still, there is a challenging agenda of benefit to women, to be introduced at non-government and government levels. It is necessary to overcome the conventional welfarism that reduces policies and projects for women to the social sector and marginal interventions. Women's organizations are working on a global plan and transectoral strategy to meet women's needs as producers and reproducers. The government's new policy proposals and definitions coincide with Women in Development(WID) and with some conceptual elements of the gender approach.

Apart from these aspects, the Bolivian Government recognizes specific environmental problems by addressing the central question of resources, poverty and development, taking into consideration sustainable development principles. In Bolivia, it is necessary to outline a policy proposal to integrate women's concerns and their potential contribution into the sustainable development debate and the projects designed within this framework.

The environmental problems in Bolivia *(Taken from official documents of the National Secretary of Environment)*

Environmental problems in Bolivia are deeply linked to the historic process of the country's development. The limitations imposed by the development model have lead to a series of environmental degradation processes.

Manifestations of poverty such as the lack of basic services, malnutrition, the weakness and limitation of the educational system, constitute a vicious cycle, increasing poverty, degrading the habitat and therefore exposing the great majority of the population to an unhealthy and precarious quality of life.

Although we share the effects of a deteriorating environment throughout the planet, we acknowledge that the country has a range of diverse and specific problems.

a) Policies and actions

In this context, the state is focusing its attention on environmental issues relating to sustainable long-term development, compatible with the environmental resources.

The national framework sustained for development and conservation is linked to the following "strategic lines": a) facing poverty; b) sustainable use of resources; c) organizing the territory; d) developing technologies that are compatible with our social, natural and cultural reality's and e) developing a new economic-social strategy that takes into account basic population needs and the environment context.

Environmental problems resulting from historical, socio-economic and political factors are linked to an excessive exploitation of the natural ecosystems.

As a southern and underdeveloped third world country, we recongize that: a) the dependency on natural resources is direct and profound, b) Extreme poverty is even more serious due to the non-sustainable use of natural resources; c) the international ecological debt of the industrialized world is considerable d) the technological gap between countries and within our unequal societies is widening.

b) The environmental institutional framework in Bolivia

At the State national level:

The "Secretaria Nacional del Medio Ambiente" (SEMNA - The National Environmental Secretariat) was created by the Republic's Law dated April 1992, as a dependency of the Presidency. From a trans-sectoral perspective it is responsible for formulating and directing national policy concerning environment.

The Environmental Committees of the Bolivian National Congress were formed in the Senate and the House of Representatives and commissioned to promote and develop the process of environmental legislation.

The "Fondo Nacional para el Medio Ambiente" (FONAMA - National Fund for the Environment) was created in 1990 and is responsible for attracting funds from internal and external sources, for the financing of plans, programs, projects, and scientific research in the environmental field.

c) Achievements and challenges

Bolivia has carried out and is currently implementing a series of actions at the legal, normative and operational levels, among which the most important are:

- The declaration of an "ecological pause" established on January 1990, and an indefinite prohibition on hunting was declared.

- The approval of a moratorium relating to the forests.

- The enactment of the General Law on the Environment.

- The launching of an environmental Action Plan for Bolivia as a planning process which aims the permanent participation of different social actors at the regional level.

- The creation of a National System of Protected Areas, a framework within the project for the "Preservation of Bio-diversity and Ecosystems in Bolivia".

- The launching of three pilot programs on environmental education in rural and urban areas, taking into consideration the three- macro ecologic areas of the country.

- The exchange of external debt for environmental programs in Bolivia.

- Resolutions on behalf of the native populations by recognizing a total of 2,175,396 hectares for the native populations of the country and defining their active participation in all the environmental programs in their own natural habitat.

The role of women in environmental management

Two case studies were undertaken in different communities in the rural areas, taken from recent research done by Rosario Leon, published in Ecuador with the title: "Women in Bolivia and Trees".

First case study: "What it takes to live in Matarani"

The first study shows the situation of farm women and their attempts to fight erosion.

Matarani Community - general information

Geographic position and altitude: The region comprises mountainous valleys, arid and rustic, at 3,100 meters over sea level. The few existing trees date back to periods before agrarian reform, and have been cut down. Other foliage is practicaly non existent. Matarani is located 2.5 hours from Cochabamba which is the third most important city in the country, with over 400 thousand inhabitants.

Population: Two hundred families existing in a gradual process of modernization of their traditional habitat. Women, which constitute 51 per cent of the population, are mostly monolingual (speaking only the native and original language of Quechua). It is estimated that the percentage of illiteracy is about 80 per cent. There is also an important migration of the male population toward urban centers and toward production zones of the coca leaf.

Economy: Agricultural activity with low exedentary harvests. The economy is one of subsistence. The ground has lost its productivity. There is no forestry programme in the area; nor are there sufficient development projects.

Women's role at local level: There is a well organized Women Peasant Union. Women have different activities at the following levels: a) at the economic level, they work in the small family farm, in the closest town fair and in places assigned to process food and storage; b) at the cultural level, the territory is divided into comunal, familiar spaces, and the places of the "others"; and c) at the political level, they define their identity and their citizenship by the territorial organization and general structure and roles played by the Community Farmer's Union.

Women and the resources- land, water and firewood: Women do not have any property rights over the land. Only widows manage their farm without having a legal property right. Legal ownership status is given to men. Consequently, if men migrate the access of women to credit and loans is impossible.

Water and firewood are precious resources. There is a waterfall near the village, but in a low lying sector, so it can not be used in agricultural activities in the highlands. Although this waterfall could take care of the water needs of the population, women must walk at least one half kilometer per day to pick-up water, a resourse which is administrated with care.

Greenery is practically non existent in Matarani. It is necessary to walk two hours to another area, where zone trees can be found. Occasionally, they purchase firewood, which is brought from the valleys. The high cost of firewood and of stove gas makes these resources available only for very special events, such as the elaboration of "chicha" and local festivities.

The lack of firewood has serious consequences for the system of nourishment for the families of Matarani. Cooking is not a pleasant activity for their women. The introduction of changes in cooking fire and the programs of "home improvement" have moved the traditional cooking area outside of the home, and causes difficulties during the rainy season.

Women's attitude to their forest surrounding: Inspite of having information about forestry programmes and erosion, women of Matarani have never shown any interest in or need for forestry projects. Their concept of a tree is a particular one. They believe it would be nice to have a tree close to their house or argue that there is not enough land to cultivate, that trees need too much water, etc. They stand for immediate and practical needs, without a long term perspective of improving their enviromental habitat. They prefer minor or intermediate forestry projects.

Second Case Study: The Green Curtain of Mama Quewina

This study describes a common situation in the Andes: the introduction of an artificial forest in a peasent community in response to the ecologic deterioration and the attitude of women to this type of intervention.

Location and altitude: Mama Quewina is a community located 3,500 meters above the sea level. A high Andean mountain 'puna' with eroded soil mixed with artificial and natural forest areas and fields covered by some foliage and small shrubs. The community is 2 hours away from the closest city in the region.

Population: Before the land reform (1952) this community used to be a large farm. It has about 100 households mainly headed by women, except during seed and harvest time. There is deterioration of the traditional familiar and communal structures, and very few possibilities for overcoming difficulties. Young women have began to migrate to larger towns and cities looking for a better life.

Economy: There are poor agricultural and handicraft activities. Food production does not fullfil local demand. Family incomes are very low as Mama Quewina is one of the poorest communities in the region. Technical assistance in forestry is available.

Ecologic deterioration and community attitude: There is a confusing attitude related to the severe environmental damage in this microregion. Inspite of ecologic deterioration, people are conformist, skeptical and do not show great enthusiasm towards conservation projects. Farmers continue to adopt with degrading agricultural practices. There is a evident lack of perspective of the agricultural production as a way of living.

The cultural and historic traditions about the way, in which individuals related to nature and their environmental surrounding seem to be lost. On the other hand, the modernization process has not brought about adequate control and knowledge of new technologies, and about very few people understand the information given by forestry and other types of development projects.

The recently planted trees responded to foreign initiatives most of them linked to food aid programmes within the "food for work" schemes.

These projects have a "welfarist approach" and demand a high level of women's voluntary participation, since they have been excluded from the mainstream of development projects and technology.

Women, forests and their enviromental surrounding: As happens in other areas, women are taking the responsibility of several economic and productive activities in the rural area. Inspite of the rupture of the links between men and nature mentioned above, it seems that women mantain and transmit cultural wisdom in their relationship with nature. They still have all kinds of magic arguments to explain different situations.

Women distinguish between forests and mountains with practical and concrete judgements. They prefer to recognize the practical use of the trees as a source of raw material to improve their homes. The farmer had serious difficulties in commercializing the wood obtained from the trees they felled. The older a woman is, the deeper her knowledge about the surrounding vegetation.

Women have a great ability in using the traditional cooking-stove. They certainly have a potential agroforestal attitude that should be encouraged. As in Matarani, women have a profound knowledge about the rational management of the available resourses in their community.

Some conclusions and guidelines for establishing a political agenda for women linked to sound and sustainable development

The two case studies described above demonstrate that:

- Women play a key role in the several activities that involve the agricultural subsistence system.

- Women possess great ingenuity and knowledge about the nature which surrounds them. They discover the value of the most insignificant vegetation as it relates to diverse home uses (medicinal plants, trees, foliage, etc)

- They are potential actors in any alternative and sustainable development intervention which will also help to revalue cultural and social identities that have been understimated over the years for historic and economic reasons.

- The exclusion of women from development projects and from the mainstream of development resources and benefits reflect the subordinated status of women in society. However, neither traditional agricultural and social systems, nor women within them, are totally free of the distortions derived from the inadequate influence of the modernization process at all levels of activities. Therefore, it is impossible to even consider any "romantic" approach about turning back to the subsistence economy.

- Poverty and unequal access to resources, between social and economical groups, and between countries are still the major problems to face. As the Bolivian President, Mr.Jaime Paz Zamora stated at the UNCED 92 "We do not want a preserved world with a deplited human being".

Beyond the theoretical debate within the Women, Environment and Sustainable Development (WED) conceptualization, it is important to clarify the strategic objectives of women and to reach them through concrete and realistic interventions.

Empowerment and autonomy of women at all levels of society, and the progressive democratization of social and economic roles of men and women inside and outside the family structure, are still the strategic and long term objectives of the women's agenda.

A positive and feasible political agenda and strategy for WED should be built along the following principles:

- Women's involvement in environmental projects can no longer be a separate branch of global development policy. Consequently, a transectoral perspective should be introduced. It is also necessary to interconnect the positive lessons of WID with the WED approach.

- Women of the South should be aware of the risks of violence and other types of international domination that might result from outside ecologic conceptual models of interventions. Horizontal relationships should be stressed between donors, recipient countries and beneficiaries.

- The rise of the ecological awareness and the need to change women's status in the southern countries should address several issues such as: Women's access to resources, appropiated technology and training, the recognition of their reproductive rights, their participation in the project implementation process, the recognition and revaluation of women as privileged managers of the resources, and the need to understand the roots of urban and rural poverty and its consequences on environmental degradation.

- The debate about the new environment and sustainable development alternative model emphasises a central question in the women's agenda: It creates a favorable climate and new attitude, open to accepting a diverse world, revaluing different cultures and ways to relate to nature. It also helps to understand women and their aim to reach equity within diversity, to build up a healthy planet and to strengthen our democracies against any attempt to develop an authoritarian and violent world in the century to come.

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Brazilian Women: Their Thinking, Struggles and Strategies for Environmentally Sound and Sustainable Development

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Introduction

The main objectives of this paper are to: (1) describe briefly the present situation of women in Brazilian society; (2) trace the evolution of Brazilian women's thinking and actions towards a greater role for themselves in national development and environmental policies; (3) explore some key elements of the feminine perspective which have influenced their strategies towards ESSD; and (4) describe their strategies and tentatively evaluate their accomplishments in different fields, the difficulties they face and some of the Brazilian government's views and reactions to the role of women in environmentally sound and sustainable development (WESD).

The present situation of women in Brazilian society

The Brazilian 1991 census reflects a figure of more than 146 million inhabitants, of whom women comprise nearly 51 per cent. Population growth rates have come down from 2.9 per cent a year in the 1960s to 1.9 per cent at present. This was due to a lowering of fertility rates from 5.8 births/women in the years 60/70 to 3.2 per cent in the years 1980-90. In Brazil, 71 per cent of all married women in the 15 to 45 age range use some form of contraceptive. This is practically the same rate as for developed countries. There have been some press reports to the effect that 50 per cent of these women have been sterilized.

Brazil has also undergone a rapid process of urbanization. The number of cities of more than 20,000 people have grown from fifty in 1940 to 390 in 1980. While in 1940 there were only two cities of more than 50,000 people, there are at present more than twenty.

In the last three decades, women's participation in the labour force has increased from 20.7 per cent to 38.7 per cent for the whole of Brazil. In absolute numbers, the number of working women has grown from just over 6 million in 1970 to almost 32 million in 1989. Employment rates among women have also risen from 32.2 per cent in 1981 to 36.5 per cent in 1989. However, while in 1989, 61.8 per cent of all employed men had job contracts (fulfilling existing labour legislation), only 55.1 per cent of female employees had such contracts.

It is noteworthy that in the drought affecting Brazil's Northeast region, the relative participation of women in the regular work force has actually decreased by about 5 per cent in the last twenty years.

This seems to indicate that women are more adversely affected by environmental disasters. In addition, it is important to point out that while some 27 per cent of males ten years of age or older are now out of the regular workforce, the proportion of women in the same age range not employed outside of their households is nearly 73 per cent. It is also interesting to point out that according to official statistics, only 18 per cent of married and 34 per cent of single persons in the paid labour force are women. However, over 63 per cent of all separated, divorced and widowed labourers are women.

Despite the fact that currently 53 per cent of all university and college students in Brazil are women, there is a tendency for women who are college-educated to choose career fields which tend to have lower social status and lower salaries (or is this so because women predominate among them?). Among the professions where women comprise more than 80 per cent and up to 96 per cent of all college graduates are: Social Service, Nursing, Psychology and Liberal Arts. It is true, however, that in the last 20 years the percentage of women college graduates in some of the professional areas such as architecture, medicine, dentistry, engineering and law, has increased twofold, although in at least one of them (agronomy) they have decreased almost by a factor of five. At present, women make up less than 15 per cent of all engineers, agronomists, and veterinarians in Brazil.

Although the situation has improved somewhat in the last two decades, 50 per cent of all women who hold regular jobs now earn not more than two minimum wages (which has varied between US$ 48-100 per month in the last 12 months - depending on inflation rates), while the situation for males is somewhat better, since 58.6 per cent of them earn more than 2 minimum wages.

The proportion of women to men in government jobs has grown steadily in the last decades. Women now hold almost 25 per cent of all public administration jobs, including the armed and police forces. If these are excluded, there are more women than men in government jobs. One explanation for this is that there has been a steady deterioration of salaries in the public sector. There is also the possibility that women prefer government jobs because they are less demanding of their time, which make them more compatible with women's "double journey" (Barroso, 1990), that is, not only doing work within the household, but also holding down a job outside of the home.

However, only 11.3 per cent of all managerial positions are occupied by women. At the directors level there are only 8.5 per cent women. In public firms (e.g. Petrobras, Chefs, Telebras, etc.), executive positions are seldom held by women. There are isolated cases of women who have been elected as a Governor of a State. At present 2.4 per cent of all Brazilian local governments are headed by women, including Sao Paulo, the largest Brazilian city. However, more than half of the municipalities headed by women have been between

5,000 to 10,000 people and most of them are in the poorer Northeast region (Dirigente Municipal, 1992).

Women's increasing participation in the job market has not meant a proportional increase in their participation in either professional or labour organizations. In 1986, for instance, only 8.6 per cent of employed women over 18 years of age were affiliated to labour unions or professional associations, against over 16 per cent of employed men (Informacoes CEDEC, 1992). In labour unions, women comprise only 7 per cent of their leadership. Furthermore, 51.5 per cent of the total number of women who belong to labour unions have joined them in the last three years. Women are better represented in government employee unions than in private sector unions. At two recent national meetings of CUT and FS (the largest federations of labour unions), there were respectively 24.1 per cent and 13.4 per cent women delegates (Informacoes CEDAC, 1992). The participation of women in professional associations has increased at a faster rate; for instance, the percentage of women in the annual meetings of the Brazilian Water Resources Association has grown from 11 per cent in 1989 to 21 per cent in 1991 (Boletim ABRH, #47, 1992).

In 1979, the military government of Brazil, in response to a UN questionnaire for the World Plan of Action for the Women's Decade, affirmed that it was not developing any global strategies or specific action proposals to promote women in Brazilian society, because their situation was "naturally" getting better. However, starting in 1982, under the pressure of women's movements, a number of Women's Rights Advisory Council (WRAC) were created at the Federal State and Municipal levels of government. These bodies have supported demands from feminist organizations for public policies regarding violence against women, job discrimination, day care centers at the working places, etc.

Brazilian women and ESSD: strugges and strategies

The women's rights movement in Brazil manifested itself with the women's struggle to have the right to vote - which they finally won in 1932. The issue of political rights continues as the main theme in their agenda up to 1975, when new themes were added: job discrimination, sexual stereotypes in school curricula, violence against women, health and family planning, among others.

The 1975-1985 decade was marked in Brazil by widespread social movements in favour of democracy, amnesty for political prisoners, and civil rights in general, and against income and wealth concentration policies of the existing military regime, in which women played an important role.

These social movements were instrumental in the creation by governments at all levels of the WRACs mentioned earlier, and of special police bureaux to handle violence against women. The WRACs, in turn, together with an increasing number of women NGOs played a decisive role in the fight to have feminine citizenship rights inserted into the new Brazilian Constitution, promulgated in 1988. Outstanding among the family rights acquired by

Brazilian women are: abolition of the man-head of family precept; independence of marital status; and making protection of women against domestic violence a Government responsibility. Among the labour and social welfare rights acquired, the following should be mentioned: extending urban workers' rights to rural labourers and house servants (the majority of whom are women), and a 120-day maternal leave for these workers. However, it should be said that some of those Constitutional rights have still to make their way into ordinary laws and, more important, overcome deeply rooted gender prejudices.

Thus, with so many basic citizenship rights to be achieved, and basic economic needs to be satisfied, it is only natural that the concern of women's movements with the environment should come to the forefront somewhat later. Although women always played a leading role in the resolution of community environmental problems, the linkage between feminism and "ecologism" has not been evident. Actually, neither feminism nor the environmentally sound and sustainable development banner found fertile ground within leftist movements until the mid 1980s. Their premise was that socialism would provide the means not only to have an egalitarian society for both men and women, but would also by eliminating predatory capitalist competition, lead naturally to a healthy environment.

The return in 1985 to formal democracy in Brazil, offered an opportunity to social movements and NGOs in general, to pay attention to the specific concerns of both women and environmentalists. A number of organizations and at least one political party were created to respond to these new perspectives on women and environment.

However, it is unquestionable that the international community and media focus on Brazil due to rapid destruction of its rain forests and last but not least, the UN Conference on Environment and Development (UNCED), held in Rio de Janiero in June 1992 were major factors in redirecting both thinking and action of Brazilian governmental organizations, NGOs and women's groups in particular.

When it was created in 1990, the Brazilian NGO Forum (preparatory to the UN Earth Summit NGO Global Forum) had only 39 members, while in its last meeting in April 1992 there were more than 1200. Of these, nearly 200 were women's organizations, among which the majority (around 40 per cent) is community-based, 10 per cent are workers and professional organizations, 10 per cent are concerned with public policies at all levels, and almost 12 per cent are devoted to dissemination of information on women issues.

A 1988 survey showed that of a total of 1208 Brazilian NGOs, 196 were women's, half of which were created after 1980 (Landim, 1988). However, that survey also shows that these organizations and movements are predominantly urban (66 per cent are based in the capital cities, 44.6 per cent of which are in the Rio-Sao Paulo metropolitan areas). The present situation is not known, but judging from oral information, it is likely that the number of women's NGOs has at least doubled since 1988.

It appears that the joining together of feminist, women's environmentalist and women's working organizations is still in its embryonic phase. However, all of them have among their primary objectives a need to raise the level of women's awareness of the feminine condition (identity and roles in particular). They also tend to be less formal, usually call themselves "groups" and are more self-oriented, in the sense that they are concerned with the particular problems of their members, as opposed to advising and struggling for the rights and interests of popular groups, such as squatters, people affected by major development projects, etc. The beneficiaries of women's NGO efforts are typically: mothers, housewives, house servants, prostitutes, and working women. They also orient their actions to specific concerns of women: health (including sexuality and family planning), and human rights (issues regarding gender discrimination, sexual and domestic violence being predominant).

Strategies

Brazilian women are in the process of developing a coherent set of strategies and policies aimed at integration of their views into environmentally sound and sustainable development.

With this in mind, their participation in the organization of the Global Forum and "Women's Tent" events which took place in Flamengo Park in Rio simultaneously with the UNCED, was a landmark in the process towards perceiving women and the environment as the pervasive and integrating themes of all Brazilian social movements and NGOs. (As was widely publicized by the media, the Global Forum brought together as many as 30,000 activists from around the world). Firstly, women's coalition for organization of the "Women's Tent" provided the basis for discussion over the theme "women in environment". Secondly, for the first time, such a large group of women's NGOs, different in composition and purpose, were united around a common goal.
Thirdly, they had a unique opportunity to discover what is and what should be the Brazilian project for a democratically sustainable development. The results of this cooperative work were indeed remarkable. Women have developed their own diagnosis of the environmental situation in Brazil (although much remains to be put into writing); they have proposed alternative solutions to strengthen their organizations; and finally, they have developed material to sensitize public opinion and government.

The themes which Brazilian Women's Coalition of NGOs chose to be responsible for organizing during the two weeks event (each day at the Tent was programmed by an international women's group around a specific theme in the Women's Action Agenda developed by women from around the world), are indicative of their main concerns: population policies, health and the environment; code of environment, ethics and accountability.

Despite the visibility which the "Women's Tent" provided them, Brazilian women's organizations are aware that their message and proposed programme of actions have reached but a very small fraction of Brazil's 84 million voters. They are aware that they are still a long way from increasing their participation in the official governmental bodies at federal, state and municipal levels.

Certainly, one of the major tasks ahead is to put into practice Brazil's advanced environmental legislation - a victory of its civilian society in the 1985 reformulation of the Constitution. In any case, to implement policy changes demanded by the Women's Agenda in Brazil, will require that women continue to work together.

The time is past when the term "non-governmental organization" meant to many people "an anti-governmental" organization. Both NGOs and governments appear to be making efforts to close the gap between them. Particularly at the state and municipal levels, women's groups are gradually seeking government financing of their projects. For their part, there is still some reluctance to trust the government and political parties. Consequently among the NGOs there exist technical and financial relationships with other NGOs rather than with governmental agencies. In this regard, it is important to point out that the major source of funds for large Brazilian NGOs are their foreign counterparts, women being no exception. However, the great majority of Brazilian NGOs are small and survive with the contributions of their members and sporadic generous donations of private citizens and private companies and foundations. In this regard, there is wide resentment among women's organizations at not being able to secure the necessary funds for institution- building and extension from international agencies. There is a widespread belief that activities should always work for free. One of the consequences of this is that women's groups tend to keep their level of organizational structuring low, and they tend to form networks to compensate for their individual weaknesses.

In order to fulfill the demands of women in communities, local governments are encouraged either to establish specific programmes for women or to give special directives so that community-wide programmes will to some extent result in meeting the particular needs of women.

In this regard, a large number of women elected in 1989 to city councils are helping municipal governments in the task of meeting women's needs through broad legislation. Lately, there has been a switch to propose by-laws specifically oriented towards women's interests and values (Reston, 1991).

Women's organizations are pressuring local administrators to add to their recent efforts to increase community participation, and special attention is being paid to open up new channels which may guarantee women's involvement. They demand that women's organizations be recognized as privileged interlocutora within social movements and NGOs in general, as a necessary condition for local policies and programmes to benefit women.

Because the responsibilities for many public services have recently been decentralized and are now the responsibility of municipal governments, it is expected that many health, housing and sanitation questions of specific interest to women will receive higher priority at this municipal level of government. However, women's chances to influence municipal policies will very much depend upon their capacity to mobilize and organize, as well as on government's response to their just demands.

It is important to note that many local governments services have a direct impact on household work, and consequently have a differentiated impact on the work and the quality of a life of women. Water supply and sanitation facilities are a case in point. Housewives know exactly what it means for them and their family to have or not to have tap water, sewage and garbage collection, since it is they who are responsible for both the chores of the house and for family's health care and caring.

One should keep in mind that housing and urban services are more important to women than to men. For instance, the lack of basic urban services in shanty-towns affects women more severely than men, since women normally remain working in their households or have informal jobs in their neighborhoods. Poor public transportation facilities also make it more difficult for women to have access to work. Thus, provision and improvement of public urban services will greatly improve the quality of life of the poor, but will benefit poorer women even more.

In this context, it is important to point out that the UN and the International Drinking Water Supply and Sanitation Decade(1980-90) have played an important role and have influenced Brazilian government policies regarding the specific needs and demands of women with regard to basic urban and rural public services.

However, if we look at the rural sector, most local governments still fail to give necessary attention to rural women's needs and to their important role in food production. We should call attention in this respect to the fact that Brazilian women have more difficulty than men in having access to land, water, credit, technical assistance, marketing and to rural cooperatives and other forms of agricultural organizations (Reston, 1991).

Official organizations responsible for rural extension have essentially maintained an emphasis on household economics and management, hygiene, and domestic food processing. Their focus in on the family rather than on women. However, it is possible that with the municipalization of rural extension services, there will be more opportunities for special attention to be paid toward gender needs. Again, however, this will depend on a maintenance of women's capacity for mobilization and organization.

However, feminist groups in Brazil warn that there is a risk that by emphasizing services for women inside the house and in the neighbourhood, one may be contributing to the reinforcement of women's traditional role as housekeepers, with all the disadvantages that this role entails.

It is remarkable that in four nation-wide meetings of Brazilian universities on the environment, held from 1986 to 1990, the issue of women and environment in development was not identified as an agenda item, nor were any papers related to women presented.

New thinking

As previously stated, the initial concern of organized Brazilian women (as was the case with the majority of NGOs), had to do with basic civil rights. The environment as a pervasive and integrating theme is a recent phenomenon. However, the idea still prevails that to struggle for a just, humane and equitable society is a precondition to environmental activism.

Another idea which permeates Brazilian environmental thinking is that sustainable development in one country is inconceivable, since at present, most national economies have been transnationalized to a degree that makes isolated country actions of little impact, and it is this reality which they have been aware of for a long time.

In other words, Brazilian NGOs believe that one cannot or should not think about sustainable development as separate from considerations of shifting to a new paradigm of economic rationality. They criticize the prevailing ideology of development which encourages increased patterns of wasteful consumerism, and they want instead a change in existing consumer patterns, especially in the developed countries and redistribution of wealth and income in favour of the poor. Above all, they insist that sustainable democracy is as important as, and perhaps a precondition to, sustainable development.

Here there is an opportunity for a more in-depth consideration of women's thinking on the subject, which is apparently beginning to influence the general attitude of Brazilian society towards an environmentally sound and sustainable development.

The dominant male culture of "man-over-nature" is known for its arrogant attitude towards, and distance from, nature. Because they did not feel part of nature, men did not seek to understand it, nor did they feel it necessary to be in harmony with nature. Anxious to detach themselves from nature, they became its predators, and perceived the environment as though it were an object to be transformed and manipulated.

By contrast, women have at the centre of their existence different values: priority to interpersonal relationships, care for people, protection of life, high value for affection and intimacy, etc. These values are closely related to their characteristic intuition, sensitivity and empathy, which, in turn, has sometimes lead to their resistance against observing or understanding the world from a rational perspective.

Thus, they have proposed to "feminize" the world (Oliveira, 1991), in order to make it possible for a genuine dialogue and partnership between human beings and nature, after all the frustrating and disastrous attempts to get away from it, to ignore it, to redefine it. These propositions are in sharp contrast to (and represent women's response to) men's perceptions of and attitudes towards women as backward creatures, lesser human beings, due to their supposed submission to instincts, deviations from rationality - in short, their closer identity with nature.

Brazilian women are therefore pressuring their society and environmental organizations in particular, to rethink the role of nature itself. Of course, this should be much easier for women's organizations, because they have not moved too far away from it, and because women have always known how to care.

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Environmental Protection of Highways and Water Transportation

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It is my great honour to have this opportunity to participate in this inter-regional workshop together with sisters from different parts of the world. I am Liu Hong, engaged in the environmental protection of highway and water transportation, in the Institute of Scientific and Technical Information of the Ministry of Communications.

In December 1991, China's first noise-protection screen on Guiyang-Huang guo shu Highway in Guizhou Province, was successfully constructed by five women builders: Ms. Nie, myself and three other women, which efficiently halted traffic noise disturbance. This thus proves women's role in environmental protection and whatever men can do, women can do too, just as was said in a speech at this workshop: "the half sky held up by women is also sunny and bright".

In the monitoring and research of the environment, we sadly found that highway construction and usage could bring about serious pollution, for instance: cutting down trees in large numbers for road construction, leading to the disturbance of the former topography, soil erosion and the deterioration of the ecological environment; the presence of dust and asphalt gas throughout the asphalt-mixing site, including some substances which might make people suffer from lung disease and cancer; and the sound of the asphalt mixer at about 100 decibels.

The exhaust gas given off by vehicles causes atmospheric pollution which can result in different kinds of disease; the lead dust given off by the vehicles increases the level of lead in the roadside earth and in crops; pollution of the drinking water results from the dirty water from the gasoline station and along the road; the traffic noise increases cases of neural system disease, heart, and blood vessel disease which has greatly affected people's lives, study and work.

In all this pollution, women and children are the most vulnerable since various poisonous gases can be very harmful to women, particularly to those who work in the asphalt-mixing sites and fee-collecting stations along the highways, and to those who are engaged in pollution research work. In addition, those poisonous gases can also deform children. The sharp noise can frighten babies, making them tremble, and can damage the human brain and functions of the heart and blood vessels. From investigations, it has been learned that the impact of noise on the pregnant is 20-30 per cent higher than that on healthy people.

Therefore we have realized that it is up to us, the environmental protectors, to protect the health of residents, particularly that of women and children, which is definitely our responsibility. However, we do encounter some difficulties in our work:

1. The technological level being met is not high enough. China is a developing country, compared with the advanced technology and techniques adopted by many developed countries for many years, in terms of highway noise-protective screens, low noise pavements, car gas purifiers, pollution-free asphalt-mixing techniques and construction measures etc. There is rich experience. China is just at the very beginning. Therefore, we urgently hope to establish international cooperation, to learn about successful experiences and to introduce advanced technology from the developed countries, so as to hasten the progress of environmental protection.

2. Funds are insufficient for scientific research. Since our Government is unable to provide greater financial support, it has become impossible now for us to carry out many scientific research projects that we intend to undertake.

3. The poor working conditions for women's research can be described as follows:
Owing to the lack of advanced and automated equipment, we five women had to stand on the roadside monitoring traffic noise and recording every survey by hand, day and night. Apart from that, because of the lack of protective equipment and over-work in research on poisonous gases, some of us are suffering from disease of the liver and neural system.

4. There is insufficient understanding or support of environmental protection. People in some departments or institutions sometimes think that the urgent problem to be solved in China now is road construction, rather than environmental protection. As a result, some environmental protection projects fail to be put into plans.

Transportation is the cornerstone of the national economy. China is now at the peak of highway construction: more than ten highways are to be constructed during the period of the ninth five-year plan.

One remarkable point of the United Nations Conference on Environment and Development held in June this year was to closely link the environment to economic development, emphasizing that environmental protection should be carried out simultaneously with economic development. Therefore, we think that our work on environmental protection should catch up with the speed of highway construction, since time cannot be wasted now. And women are absolutely able to shoulder this task. Thus, we hope to get support and help from the United Nations on the following research projects:

1. Research on protection technology relating to road traffic noise pollution.

2. Prevention of the deterioration of the ecological environment along roads -- research on vegetation protection of road slopes and research on automatic planting technologies of lawns in broad areas.

3. Investigation into roadside earth and lead pollution of plants and research on prevention technology.

4. The role of planting in the prevention of atmospheric noise and water pollution and research on pollution-resistant tree seeds along roads, and the planning structure.

We believe that with the unity and cooperation of the women of the world, the Chinese women are bound to gain greater advancement in environmental protection.

The Reform and the Environment for Women's Development in China
(Abstract)

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China's reform has brought about great vitality for every kind of cause, and has also created a favorable environment to give full play to women's abilities and wisdom and some new possibilities for women to improve themselves.

Employment: wider range and more choices

The Reform and Open Policy has brought about social change, progress in production and the rise of the Third Industry, which offers women new access to employment and more choices in jobs. There were 291.1 million employed women in 1990 according to the ten per cent sample data from the last census, reflecting 44.98 per cent of the total employed, or a rise of 1.28 per cent. When we look into the industrial structure of the employment, we can see that agriculture still occupies the largest proportion, reaching 76 per cent of the total number of females employed. In the past, women were mainly engaged in assistant agricultural work. Now, women are the main labour force in cultivation, due to reduction in farmland and the out-migration of men from rural areas. Along with the socialization and specialization of agricultural production, which includes the increase in specialized households and groups in weaving and cultivating and the township enterprises, women play a more and more important role in rural economic development. Of the female workers, who comprise 24 per cent of the total female employed, the distribution among the First, Second and Third Industries has changed considerably from the Reform and Open Policy and Economic Adjustment. The ratios run from 70.5 : 17.4 : 12.1 in 1978 to 60.0 : 21.4 : 18.6. The development of light industry, non-material production sector and the Third Industry, especially the introduction of foreign capital, the establishment of joint ventures and the development of tourism and consulting services, etc., has provided women with various employment opportunities. In 1990, there were more than 20,000 women judges in China.

Education: more chances

The Reform and Open Policy has also promoted the development of education and accelerated the progress of technology and science, which has given women a wider range of access to education and self-development. And this equips women with more favorable conditions for their participation in the competition.

Perception: broader view and new practices

The Reform and Open Policy has widened women's view and changed much of women's conception and ideas. This is reflected in their struggle for real equality with men, a realization of their own value, and the change in women's roles in the family, etc. Naturally, wider choice of employment would bring about a dramatic change in the perception of occupational value. Here is an example: When the hundreds of graduate and post-graduate students standing in line for a job in a five-star restaurant in Shanghai were asked why they had applied for a job in a foreign enterprise, they answered that they "simply wanted to practice our ability, potential power and tenacity". Obviously, if they found the job inappropriate, they would search for another, without hesitation. For instance, there is an active lady who had resigned from her previous post as a division leader, has "fired" five bosses in two years and gained her recent post as a "Public Relations Miss" in Shanghai.

In the new environment created by the reform, women have met with new challenges in their development. Because of the discrepancy between the perception of the competitive and the traditional role of women, there appears to be some negative trends in women's development.

Women's self-development is hindered by child-rearing. They are generally the victims of reductions in redundant personnel in the unit and the object of gender discrimination in employment. Along with the spread of the Reform and the introduction of competitive mechanisms, the practice of the women's unit covering expenses totally during their pregnancy in the past, has obviously inhibited the development of enterprises, since this caused inequality among enterprises in competition, due to varying numbers of female workers. According to a survey made by the Shanghai Women's Federation, 46.5 per cent of the surveyed leaders of enterprises thought that female workers spent too much money during their pregnancy and this had a negative impact on the economic efficiency and competitive power of the enterprises. Some statistics indicate that female workers' leave is 7.29 times that of male workers, and for the age group of 26-35, it is 9.6. The allocation of welfare for women workers is 1.34 times that for men.

The variation of women's roles, or the change in women's roles in the family did not earn them an adequate environment for their own improvement. To the contrary, it increased women's double load in most cases. Nowadays, the number of our female workers in all industries still reflects an increase, going from 31.28 million in 1978 to 52.94 million in 1990, rising at a rate of 4.5 per cent per year. This does not include data from township enterprises. For most of these women workers, though their historical role of housewife has been changed and their economic independence has increased, their housework load has not been reduced, according to some surveys. There is little time left for themselves after their productive work, housework and child care, etc., is finished.

Some forceful women have appeared, but in general, women have something "regretful" in their marriage, family life and gender characteristics.

Some recommendations

1. Improve women's education and knowledge structure, strengthen their awareness of their participation and potential competitive ability by special educational programmes to raise women's quality of life and to make them fit into the new environment of socio-economic development.

2. Replace the existing social welfare system for fertility by a more reasonable alternative, to create an adequate environment favorable to women, to enable them to fulfill their double historical mission (fertility and production).

The Cuban Woman as Object and Agent of Rural Development: The Role of Women in the Integrated Program of Sustainable Development of Cuba's Mountains

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Problem addressed

Cuba's mountain zones are more than 19,000 square kilometers in area - nearly 17 per cent of the total territory. They are inhabited by close to 720,000 people, just over 6 per cent of the demographic total. At the time of the Revolution, the country inherited a mountain zone eroded and decimated by exploitation of its natural resources. Years later, other circumstances made low-lying rural and urban zones of a rapidly developing revolutionary Cuba more attractive. This is why there was a large-scale exodus from the Cuban mountains for 20 years with a resulting low population density, and a high percentage of males as a logical consequence of a selective emigration process in which more women took part, especially young women who left in search of more diversified employment and a more highly concentrated availability of services - characteristics typical of urban areas.

Even today, nearly all of the forest land still existing in the country and the best climactic conditions for coffee and cocoa cultivation are located in these regions, where precious indigenous animal and plants species are preserved in their natural habitat.

This situation, and the need to promote the recovery of these territories, with their excellent natural potential, prompted the implementation in 1986 of the State Program for Integral Development of the Mountains. The "Turquino Plan" (so-called in an allusion to Cuba's highest peak), gave continuity to all the efforts towards economic recovery and investments. Socio-economic activities have been underway in the territory since 1959, but now with a perspective of integration of economic, social and environmental objectives.

This program or project for rural development on a large scale has as the following basic objectives:

- to assure the uninterrupted sustainable socio-economic development of these territories, without compromising future generations' abilities to satisfy their own needs, introducing scientific and technical achievements for increased coffee and cocoa production and the improvement and proper exploitation of the forests.

The development in question should be achieved while reconciling interests related to the economic recovery of these territories with those arising from the satisfaction of the population's material and spiritual needs in terms of living conditions (social development), but in such a way that the productive activity itself becomes a generator of social development, and social development guarantees the most effective and efficient productive activity. However, this concept of economic development promoting social development can only be sustained with an understanding of the need for protection of the physical environment or natural surroundings, which are of a very varied and fragile nature typical of tropical mountain ecosystems.

In the case of the Program for Integral Mountain Development Turquino Plan, the population-development-environment interrelationship seeks the promotion of productive activities which generate social well-being while at the same time adopting a rational utilization of natural resources and addressing the special needs of the local environment.

The Turquino Plan seeks to put into practice an economic and social development model which takes into account:

- efficient development of a solid base of coffee cultivation, accompanied by agro-forest and silvi-pastoral systems adapted to the existing topographical and climatic conditions.

- Recovery and gradual enrichment of soil and hydraulic resources, as well as the flora and fauna, through reforestation and recultivation of degraded lands and preservation of animal species, and the adaptation and extension of other resources which have nutritional and commercial value.

- processing of agro-forest and livestock production through efficient integrated small and medium capacity industries.

- treatment of waste, use of renewable energy, irrigation and biofertilizers, and introduction of biological pest control methods.

- striving for nutritional self-sufficiency for the inhabitants of these territories, which does not contradict the need to create production surpluses for national and foreign markets.

- establishment in the mountains of a community of coffee and agro-forestry workers - as the basis of organized production, along with private owners of land, and representatives of other social forms of land tenancy, all devoted to this type of work; small private producers and collective or cooperative producers.

- consistent territorial organization of state and non-state agricultural and livestock activities through the integration of 26 state municipal agricultural-livestock-forestry enterprises, which are structured in 103 farms. These, in turn, as basic production units (BPU), would also guarantee technical assistance services to individual farmers and coffee cooperatives which work with the Credit and Service Cooperative (CSC) and with more than 400 Agricultural and Livestock Production Cooperatives (APC) farms, respectively.

- consistent diversification of the use and training of the skilled labour force on the basis of local job resources, guaranteeing the presence in all mountain areas of educational facilities and staff at all instructional levels, including university.

- reinforcement of the technical-productive infrastructure (roads, power lines, etc.) and the progressive improvement of the quality of life on the basis of guaranteeing basic services (health, education and other less frequently used services in communities or settlements associated with the work area (BPU, APC).

- guarantee the enjoyment of leisure time and the revival of traditional artistic-cultural activities through cultural work at the community level.

- implementation of integrated policies of stimulus and social recognition of agricultural work and life in these territories.

- an education system which integrates formal education (general and professional instruction) and community and family education in order to prepare the local population to take over the administration and execution of this project, and to promote local identity through the introduction in schools and in popular communication programs of objectives aimed at knowledge and master of local agro-productive techniques, nutrition, health, local history and geography and proper interaction with the environment.

- Grass roots participation in the transformation of the surroundings and in local decision-making, guaranteed through the integration of the Mountain Community Board (at the settlement level) and the Peoples' Councils (at the territorial level) and the different agents for community development: leaders of basic institutions (government, women, unions, youth, farmers, professional engineers and technicians, teachers, doctors, cultural workers), and other leaders (Peoples' Power delegates and community activists).

- implementation of municipal master plans based on these principles and their minimum local expression at the level of the community and its Basic Unit of Production and/or Cooperative, combining social-community and agricultural and livestock development projects.

Unquestionably, a factor in the successful attainment of all of these plans is the presence and active role of women, as recommended in the measures approved for execution in UNCED'S AGENDA 21. It is logical that many actions and measures generated by the Turquino Plan tend to favour the economic and social situation of women living in the area, who, along with the men, become the object of social development policies, benefitting from the investments and services promoted by the integrated Development Program, and active, productive agents of change of the environment where they live, taking on new and diverse jobs resulting from investments which are required by community development.

The territory, the population and the women affected

The mountain regions targeted for development by the Turquino Plan are defined as such whenever these areas are 200 meters or more above sea level, within 4 mountain masses or physical-geographic formations: the Guaniguanico Range to the west, the Guamuhaya mass in the centre, the Sierra Maestra in the southeast and the Sagua-Baracoa mass toe the far east.

These masses are distributed across 8 provinces and 47 municipalities, most of which combine plains and mountains. The development program being carried out in these regions involves a broad, heterogeneous geographic area which results in great diversity from the environmental and socio-economic standpoints and therefore calls for differentialized treatments which respect the areas' pecularities and diversities.

More than 700,000 people live in the mountains with an average demographic density of 36 inhabitants per square kilometer - much lower than the average for the rest of the country (97 inhabitants per square kilometer).

Just over 20 per cent of the mountain dwellers live in urban areas in approximately 1900 settlements which include more than 140,000 houses, averaging close to 400 persons per settlement and just over 4 residents per home.

More than 335,000 of the mountains' residents are female, giving a male index of 110 males for every 100 females, typical of rural areas which have undergone sex-differentiated emigration processes. Females over 15 years of age, considered women for our purposes, number close to 226,000, and benefit greatly from the Turquino Plan.

Focus and methods

The State Program for Integrated Development of the Mountains Turquino Plan implemented by the Cuban Government is accompanied by a program of scientific-technical activities which are also of an integral character and which include both research projects supporting the execution of the project, and continuing education programs for farm workers, technicians, agronomists and other professionals working in the mountains, guaranteeing the updating, extension and dissemination of the achievements of science and technology in different disciplines.

Research covers a broad spectrum of themes and specializations related to agrotechnology of different kinds, ecology, economy, geography and social science, to name the most important. The research results support the development and execution of the project and their aims are: to obtain knowledge about the area targeted for change to evaluate the program's impact on the territory, environment and population; to formulate adjustment policies for the development program objectives; to create new technologies, methodologies and ways to organize production and to adapt other scientific and technical findings to the area.

Research results are carried out through the National Coordinating Commission for the Turquino Plan, which includes the participation of representatives of local government and organizations, different state executive institutions and the more than 300 researchers working at the program.

Among the more socially oriented research projects, there is particular interest in the evaluation of the consequences of the Turquino Plan for the population and environment, especially on women (since they showed the greatest tendency to leave these territories), as well as an analysis of women's participation in the transformation of the environment.

The methodological focus for the evaluation of the rural development project's consequences for women and the analysis of their participation in the transformation of the environment is based on the combined application of compared socio-demographic analyses ex-ante evaluation (immediately before or immediately after the beginning of the project), and the concurrent or follow-up evaluation. This last method allows an appraisal of the changes and evaluation of the consequences of the project at regional, community, family and individual levels (including women) - every four years at the regional level, previously selected according to the intensity of the investment process, through interviews and surveys at a fixed sample of more than 3 thousand homes which are revisited. Also included is a research team observation of the participants and community level activities are being organized in the research-action field aimed at helping community residents to determine their main problems and to implement the solutions contained in community social development project.

The results or consequences of the rural development project are conceived in three forms or modalities: product - goods production, investments made, or services provided as part of the project itself; the effects of the use of such products by the beneficiaries; and the impact, expressed in terms of changes in the attributes or characteristics of the residents who have benefitted (objective, qualitative level) and also changes in terms of personal satisfaction, attitude, and behaviour (subjective level and demographic level). There is no doubt that the results of the rural development project will appear at different times, and that evidence of those particularly related to the human behaviour will appear in a longer period of time.

The consequences of the project tend to be evaluated at three different levels of action: living conditions, demographic variables (fertility, migration, mortality and morbidity) and basic population sectors (woman, youth, senior citizen, child, social group).

At the same time, different areas of vital human activity that allow a description of a certain way of life help to structure the system of variables and indicators expressive of change or consequences of the project: production and work, domestic/family and material consumption, education, health, recreation and leisure time and social relations.

Female participation in the project

This large number of research projects included in the Turquino Plan program of scientific support activities and the fact that women's participation in national scientific activity is high, explains why the number of women participating in the execution of the Turquino Plan is also large. In fact, it is more than 60 per cent of the total number of researchers. The director of the scientific activities program coordinated by the Cuban Academy of Sciences is a woman.

But this only explains women's participation in research activities supporting the implementation of the Turquino Plan Development Program. The mountain women, from different social positions, also participate, either as Peoples' Power officials in the Peoples' Councils, or on the Mountain Community Boards - a form of local government in leadership posts of the Cuban Women's Federation.

All of these women contribute to the implementation of the project, as well as more than 140 women engineers working in the Mountain Agricultural and Livestock Enterprises, more than 10,000 women education workers and the nearly 630 women family doctors and nearly three thousand nurses who take care of mountain dwellers. All of them are agents of social development in the broad program of education for development that goes hand in hand with the Turquino Plan.

Obstacles and sociocultural restrictions

There are no obstacles of either a constitutional, judicial, administrative or labour character which limit female participation in the project. In any case, the existing Family Code which is in effect on a nation-wide basis aims, among other things, at promoting equal rights for women, and supports this participation.

The women who live in these areas take on household tasks, and in many cases, combine them with work which is purely productive or which involves participation in service and in socially oriented participatory community work, through the different institutions that serve as channels to people's participation in local decision-making, such as Cuban Women's Federation delegation, Peoples' Councils and Mountain Community Boards.

Participation at the base is aimed at a more active role in the transformation of the environment which promotes sustainable local development. On the other hand, study programs for different levels of instruction and other programs on environmental education which will form part of community social development projects, guarantee that women are able and eligible to work for the promotion of systematic environmental protection.

Major results in terms of development and the environment

In terms of production, over the past five years the Cuban mountain area has multiplied by nearly 1.3 times in terms of the total land surface planted with coffee and has significantly increased in production and yield. The work force employed in the state coffee and cocoa industry totals close to 30,000.

The general results of the plan in terms of projects or investments in the domestic family sphere include 84 per cent of all housing supplied with electric power, 13 new totally constructed communities complete with all basic services, and more than 424 kilometers of paved roads between 1987 and 1990. The education sphere shows the construction of 111 new elementary schools, seven secondary schools, two pre-university high schools and three university centres, designed to guarantee that young mountain dwellers can continue their education without leaving their homes in the mountains.

Other results related to the spheres of health and recreation indicate that during the same period, 873 family doctor home-clinics were built in the country's mountains.

Family doctors provide general health care for an average number of 200 families. This situation has had as an effect an increase in the mountain resident doctor ratio to close to 700 and a resulting impact on demographic variables, especially infant mortality, which is around 12 per thousand born alive.

More than 60 video theatres have been built and have had influence in terms of the way free time is used. The cultural and information level of the mountain dwellers has improved, even in terms of scientific and technical information since a wide variety of films are shown at these video-halls.

The work of the "Casas de Cultura" and the Peoples' Culture Councils at the community level has also contributed to the development of artistic expression and the revival of popular traditions.

In terms of the impact on the level of demographic variables, the Turquino Plan as a large scale integrated development project has helped to reduce excessive demographic pressure on the territory, since as a logical consequence of economic and social development, the fertility level has dropped, with a cross reproduction rate close to the replacement level (one daughter per woman at the end of the fertile period) or lower, which in fact could become a demographic problem though not of the type which characterizes rural regions in the rest of the developing countries where fertility levels are relatively higher.

The impact of the Turquino Plan may also be observed in terms of internal migration. The migration rate now has positive values.

In the reforestation and soil preservation spheres, we can cite the planting of more than 350 million seedlings of a variety of species, 128 million planted directly by area residents. In this way, the hydrographic basins' hydro-regulating strips are being reforested, degraded lands are recultivated and forests sealed.

Agro-technical research findings have been developing coffee planting and production technology which seeks not only to increase agricultural yield, but also protects the environment and nature. Therefore, the promotion of new coffee groves does not imply deforestation because it is done through a careful selection of species to be preserved, which at the same time guarantees that each spot provides the shade needed by the coffee trees.

Other measures to protect the soil and retain water, such as natural curbs and live barriers, are applied to stop erosion which affects such steep slopes.

Agricultural and livestock activity is based on the predominance of the use of biofertilizers, and on biological control of plants' natural enemies, much of this with resources from the mountains themselves.

Other advances, now observable in the domestic-family sphere which reflect the intention to conciliate economic, social and environmental interests, can be seen in the use of renewable sources of energy to generate electric power, and through the construction of an important number of mini-hydroelectric generators, which guarantees a level of electricity for more than 5,300 homes. On the other hand, the process of construction of new settlements takes into account elimination of waste and residues through prior treatment and the use of solid waste as a fertilizer.

Findings about women

There is no doubt that women have benefitted from all these achievements, not only because they are direct recipients, but also because of the repercussions these improvements have had in terms of changing women's attributes or characteristics and those related to their attitudes and behaviours.

The female work force has grown considerably and with it, female employment, which in some places has risen from 31 to 45 per cent in four years. Women now represent more than 25 per cent of the total number of agricultural workers in the mountain territories.

Diagnostic studies (ex-ante studies) carried out in some regions before implementation of the Turquino Plan did not find a single woman professional, official or technician. Four years later, 5 per cent of them hold posts of this kind. Logically this has also been possible thanks to a consistent increase in educational levels, propitiated by the presence of facilities for all levels of education. As a result, the number of females over ten years of age who had completed 9 or more grades went from 20 per cent in 1987 to close to 40 per cent in 1991.

Before, younger women between 15 and 29 years of age that had not completed 9th grade, accounted for 52 per cent. Today, 80 per cent have achieved 9th grade.

Development has also had an impact on attitudes about fertility and potential emigration (tendency to emigrate).

In many areas, 30 per cent of women over 12 years of age feel that the ideal age for marriage is at least 20 years. There was a time when only less than 22 per cent of these same women held this view. The average number of children born alive is higher in 1991 than in 1987. This is a result of women's increased participation in the areas' social and economic life, and more knowledge about and use (if they wish), of contraceptives. All of this has meant that in some mountain regions, the fertility level is lower than that needed for replacement levels, mentioned earlier.

The attitude about emigration, a variable the Turquino Plan must work to diminish, has also changed. Close to 25 per cent of women above 14 in these areas living in these areas declared, before the Plan was enacted, that they had thought of leaving the mountains. In 1991, the figure dropped to less than 15 per cent. This time neither job issues nor living conditions were a major factor. Rather, the main reason given was a desire to join relatives living on the plains.

Importance of the results and recommendations

The Cuban experience in terms of the role of women in obtaining a safe environment and sustained development reveals lessons and at the same time corroborates other findings.

There is no doubt that sustained and sustainable rural development can be achieved when rural development projects or programs delineate their objectives clearly and are implemented in an integrated way, striving for equal territorial and sectorial expression.

It is feasible and indispensable to reconcile the purposes of economic interest, capable of generating consistent social development, which in turn make economic development sustainable, in perfect harmony with, and protective of the potential and the peculiarities of environment.

Rural development projects must at the same time include different levels of action which will allow the consequences to be visualized more clearly. One of these involves those sectors of the population which are most fragile and critical, and at the same time, objects of policy - women.

The role of women in this process of implementation of rural development projects becomes a consequence of the project, and should be seen in this double light: as objects of project measures and actions and at the same time, as agents of gradual change. The

The Turquino Plan for Integrated Development of the Mountains also shows another positive aspect, which is the presence of a parallel and integral support program of scientific research activities which contribute to the introduction of scientific and technical advances, adjustments in the project and evaluation of its economic, socio-demographic and environmental consequences.

In this field, Cuba can offer its cooperation to other countries since it has both the experience and the human and scientific potential to do so. However, the cost of some of the activities which are part of the mountain development program, and of the research project which support it, justify some financial support aimed at obtaining resources which can contribute to increasing women's participation in the development of activities for education environmental protection and greater knowledge about the use of renewable forms of energy.

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Ecuadorian Institute for the Research and Training of Women (IECAIM) Decreases Rural Women's Demand for Fuelwood

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I am Dr. Fabiola Cuvi, former Board Member of the United Nation's International Research and Training Institute for the Advancement of Women (INSTRAW), and INSTRAW's focal point in Ecuador, IECAIM.

This success story which I am going to tell you is based on a program currently being executed in my country by the Ecuadorian Institute for the Research and Training of Women, IECAIM.

New and renewable sources of energy for rural women is the subject of my success story. It describes the decreasing demand that rural women have for fuelwood through the use of alternative sources of energy.

This program takes place in Ecuador, representing the Latin America and Caribbean Region, and its subject is energy. The number of people involved is 10 implementors and 70 participants.

The main problem which was to be solved was that the increasing demand for fuelwood in the rural areas of Ecuador was leading to deforestation. This adversely affected the local ecology and created hardships for rural women forced to travel great distances to find fuelwood for their cooking needs.

As a solution, IECAIM initiated a program that trains rural women on new and renewable sources of energy. Women learned how to construct energy-conserving stoves and other simple devices.

The results or impact has been the use of devices such as fuel-efficient stoves and solar-based apparatuses for heating water, alleviating deforestation. This also saves women from wasting their time, health and energy on long treks in search of fuelwood. In addition, the use of improved stoves decreases women's exposure to the harmful effects of smoke.

In the rural areas of Ecuador, fuelwood shortages contribute to deforestation and create hardships for rural women. Women are forced to waste their time, health and energy in the daily search for fuelwood, a search which often requires traveling long distances.

IECAIM (Ecuadorian Institute for the Research and Training of Women) is a national focal point of INSTRAW (the United Nation's International Institute of Research and Training for the Advancement of Women). It was founded in 1986. In August 1989, IECAIM initiated a training program for rural women designed to provide a practical solution to the problem of deforestation in Ecuador's countryside. In collaboration with INSTRAW and INE (the National Institute of Energy), IECAIM conducts training courses for rural women that enable them to utilize new sources of energy in their agricultural and household tasks. The participants - rural women belonging to the "comunas campesinas" - are instructed in the use of alternative energy sources, such as solar, biomass, geothermal, etc. Participants also learn how to construct simple devices that save energy and/or utilize alternative energy sources. These include: an energy-conserving stove that can use fuelwood, biomass, charcoal or other combustibles; a grain dryer based on solar and wind energy; and solar devices for the heating of water and for heating the dwelling. Civil servants from IECAIM and the INE, representatives of landowners and members of NGOs help organize and teach the courses, which cost approximately $100 a day. The program is funded by the Ecuadorian Government (through IECAIM and INE), the surrounding land-and-cattle ranches and NGOs from each rural sector selected for participation in the course.

To date, 70 rural women have participated in the training program. As a result, they have access to improved stoves and grain dryers. The new stoves save fuel and decrease women's exposure to the noxious effects of smoke. The improved grain dryers, based on solar and wind energy, protect the grains from animals, rain, etc. The use of these devices that conserve fuel or utilize alternative sources of energy decreases the necessity for traveling long distances in search of fuelwood. It also prevents deforestation, which causes so much ecological harm. An additional benefit of the program is the creation of income-generating opportunities for participants, who may eventually earn income by constructing and selling these new devices to other rural women. Although the IECAIM project is ongoing, the lack of financial resources presents an obstacle to the program's expansion. It would therefore be very helpful if an international institution could cooperate with programs of IECAIM in order to rapidly replicate activities and improve rural women living conditions.

What Can Environmentally Sound and Sustainable Development Do to Alleviate and Eventually Eradicate Extreme Poverty Affecting Women, Primarily in Rural Areas?

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Introduction

During the last decade, the conditions of poverty affecting millions of people all over the world have increased dramatically, and reached an extreme level of famine and destitution. This has drastically affected women in general and primarily those living in rural areas. Unfortunately, this has brought about a gender approach to extreme poverty.

On environmentally sound sustainable development, the World Commission on Environment and Development "...believes that people can build a future that is more prosperous, more just, and more secure"... with "...possibility for a new era of economic growth, one that must be based on policies that sustain and expand the environmental resource base. And we believe such growth to be absolutely essential to relieve the great poverty that is deepening in much of the developing world". 1/

The recently adopted Agenda 21 (UNCED Conference, Rio de Janeiro, June 1992) states in paragraph one of the Preamble: "Humanity stands at a defining moment in history. We are confronted with a perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill health and illiteracy, and the continuing deterioration of the ecosystems on which we depend for our well-being. However, integration of environment and development concerns and greater attention to them will lead to the fulfillment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future ..."2/

This may constitute the framework in which we can try to understand and define the role of women, primarily in rural areas, to alleviate and eventually eradicate extreme poverty.

In all fairness we should ask ourselves whether a "safe and sound environment"3/ can constitute a priority for rural women, who, over generations are contending with poverty; or whether sustainable development can be a first order priority for them. In my understanding, the equation is the other way around. In other words, how can we use concepts, policy recommendations, and institutional arrangements as effective instruments towards poverty alleviation?. How can we decrease the number of people at extreme levels of poverty, and how can we stop additional deterioration of the present intermediate levels of poverty.

General Comments on Development

The political and economic decisions adopted by the Governments of the Western Hemisphere in the last seventy years have given grounds for the general belief that the only healthy economy is an expanding economy, in which more and more material goods are produced, sold, consumed and discarded. In fact, the well-being of nations and societies is measured in terms of economic growth rates; if these decrease, it is a sign of trouble, and if growth ceases altogether, it is disaster.

Other measures of well-being are systematically ignored. If social groups do not perform according to this expanded framework, they are put aside; one has only to look at refugees, indigenous societies, illegal immigrants, the homeless, the unemployed, the marginal urban population, the street's children, the rural poor and all the populations living in conditions of subsistence and a very large fraction living in starvation.

It is not our task to analyze the reasons why, in so short a period of time, civilization has been exposed to such radical global changes, affecting in a direct or indirect form all social groups, even those of very distinctive cultural behavior - changes that otherwise could have represented a long process over several centuries. Besides the advantages, what is unfortunately lost is the human scale, values and cultural pride of smaller societies, the "repositories of vast accumulations of traditional knowledge and experience that links humanity with its ancient origins"4/; societies that at present survive without the traditional bonds of social interaction and solidarity than have been replaced by criteria of competition based upon individual accumulation of wealth through ever-increasing productivity, regardless of social or environmental consequence, increase in material consumption, money and all other economic symbols as the central focus and sole measure of progress.

We must nevertheless keep in mind that these prevailing changes and concepts are used as synonymous with democracy in some contemporary political rhetoric, at both national and international levels.

At this point I must avoid the risk of over-simplifying and over-generalizing assumptions of a political, economic and social nature. Before going any further, we must be clear that both national and international political recommendations and projects as well as any other form of institutional approach will be, and must be, part of the analysis. However, it is not our task to address them here, but rather to concentrate on the mechanisms and strategies that all organizations and individuals must adopt to help rural poor women to become self-reliant on a sustainable basis in energy and in food.

With this understanding, we must agree that poverty and extreme poverty cannot be seen only from the perspective of income, access to land and to credit, occupational activities, health and education standards and so forth. This is a very important part of the analysis and perhaps corresponds better to the institutional one. Poverty, and particularly extreme poverty, must also be addressed from the standpoint of the ability of the concerned people to look for solutions. In this specific case, the approaches and strategies that we can recommend should aim at empowering rural poor women to meet their immediate needs and demands, involving them in the whole process and by that mechanism giving them not only a sense of purpose and value, but also confidence in their abilities and also the opportunity to become self-reliant in a productive way.

Objectives

The short, medium and long-term objectives of social, economic and technical strategies addressing the conditions of poor rural women should be related to: (1) immediately provide a remedy for the survival needs; (2) help them find and/or create economic options for improving their conditions; and (3)to propose mechanisms and strategies to achieve sustainable food security, safe and secure energy, secure incomes and financial revenues oriented to alleviate the conditions of extreme poverty.

We must nevertheless be realistic because there is no quick-fix solution; there is no alternative to obstruct, to deter the process that among a very large and economically marginal population is producing an alienating subculture of survival. We must try to help people to retain the capacity to respond and to be participants of possible solutions.

The next aspect to be addressed should be what kind of cost-effective approaches can be created that are conducive to giving these populations a safe, quick and financially viable access to services and resources on a sustainable basis, including how, and what kind of safe and secure "environmentally sound" energy can be used for these purposes.

The Tragedy of the Commons

This bring us to an allegory called "The Tragedy of the Commons", which constitutes a kind of description published in 1833 in a pamphlet by William Forster Lloyd.5/ "The tragedy of the commons" develops in this way. Picture a rich pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land.....As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" The utility has one negative and one positive component.

- The positive component is a function of the increment of one animal. Since the herdsman receives all the process from the use of the additional animal, the positive utility is nearly (+ 1).

- The negative component is a function of the additional overgrazing and waste created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility is equal of (-1).

Adding together the component of partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd, and another, and another. However, this is the conclusion reached by each and every rational herdsman sharing a commons. One final day, the herdsman realizes that the rich pasture does not exist any longer; overgrazing, among other negative and cumulative impacts, have destroyed it. Therein lies the tragedy. Each man is locked into a system that compels him to increase his herd without limit in a world that is limited ..."

The lessons: strategy formulation (how to prevent or correct the tragedy)

The moral of this allegory seems to be very useful for aspects related to sustainable development, as well as a sound environment, where, besides the need for a common understanding of the problems, the needs, the solutions and the goals, the participation and willingness of the concerned people - in the present case, rural women living in poverty and extreme conditions - is required. I do not think that it is possible to alter the tragedy of the commons, which for the purpose of this presentation is related to access to food and to energy in poor rural areas without addressing the question of women as participants in decision-making processes from the basic to the highest level.

As I said before, here we cannot address either the institutional, political and economic problems, the historical background of poverty in general, or extreme poverty in particular. Nevertheless, it is possible to emphasize that to reverse and alter the tragedy mentioned above, we need a strategy that addresses the problem of poverty and rural poor women in an interdisciplinary and inter-active manner because poverty in general and extreme poverty in particular cannot be solved either by charity or aid programmes, or political decisions of partial scope.

The remedial, short, medium and long-term objectives mentioned above must therefore be addressed in a coordinated and simultaneous way. The first to be initiated should be the long term objectives because they require longer analysis and feasibility studies as well as institutional and political decisions, aspects that in addition to time, require a clear perspective about the solutions to be obtained by the process, and the means that will be required to implement it. A vision is called for!

The formulation of the long-term objectives should constitute the first lesson from The Tragedy of the Commons, to avoid the destruction of the rich pasture, thereby allowing all people living around it to receive the benefits on the understanding that they will be actively engaged in administration, husbanding and preservation. This will require the local authorities and central government to take all necessary measures to assure and guarantee that the specific area and its immediate surroundings will be legally protected and designated for environmentally sound and sustainable development programmes, including the construction of the corresponding infrastructure.

The formulation and implementation of long-term objectives should actively involve poor rural women. The role of local, national and international women's organizations becomes crucial in order to help poor rural women to overcome fear, lack of knowledge, and passivity.

The fundamental criterion for any long-term project should be self-reliance, not only because this is based upon group solidarity, a rather common characteristic of rural poor and of any group living in an interdependent way with nature, but because self-reliance provides a sense of responsibility without being disconnected from reality, the government must participate by providing the services, the financial resources, the administrative and, when required, the legal framework in a decentralized fashion.

The nature of medium-term objectives also requires consideration from the very beginning in a complementary and interdisciplinary form, parallel to the other phases. This process might be called consolidation and institutional setting, of the remedial and short-term phases, and of assessment of the present and eventual future requirements that may or may not be incorporated.

This is a very critical phase and will require solid assistance from local, national and international organizations and NGOs, reinforcing the positive results and providing all support to overcome fear, passivity, failures and mistakes. It may constitute the second lesson to avoid The Tragedy of the Commons.

The short-term objectives should be oriented towards the organization of the different phases, using a sound and self-reliant approach, involving all the rural poor woman and their families that are going to be the central care-takers and executers of the programmes, including those that are part of the remedial process. Most probably, the remedial phase should continue all the way through the period of time needed to implement the short-term objectives. The remedial mechanisms should, moreover, provide substantial support during the execution of the two phases.

This approach requires an adequate and objective assessment, always based upon the interdisciplinary and interrelated aspects of the project; otherwise it will be not be possible to avoid the tragedy described above.

Unfounded general assumptions

At this stage it is very important to address some of the negative labels commonly formulated to describe characteristics of people living in conditions of extreme poverty in rural areas in general, and in relation to energy and food;

On population, "...the hopelessly poor have a strong propensity to have more children than needed to maintain a healthy and constant population".6/ This propensity constitutes a threat to local resources, ecological equilibrium, and to a clean environment. In brief, this situation undermines the ability of the poor to achieve economic development.7/

On this critical issue, my perception is that neither political nor economic coercion, neither institutional propaganda nor 'miracle' remedies can revert the propensity of the "hopelessly poor". Family size is determined by what people believe is best for them according to social and cultural traditions. The demographic transition will take place only when development provides those populations the social and economic advantages to overcome poverty and ignorance. The transition that has taken place in industrialized societies reinforce this assertion.

On energy, one of the general assumptions is that energy consumption in rural areas is based on fuelwood, and that one billion households in developing and in less developed countries depend upon this fuel. In particular, this consumption accelerates: (1) rapid deforestation, (2) erosion, leading to an ecological crisis; (3) rural energy based on local biomass fuels - fuelwood, charcoal, animal wastes and agricultural residues - which contribute to a net increase of CO2 emissions. Energy efficiency is not applicable in poor rural areas. As a good mechanism to support the poor, energy prices should be subsidized. Energy strategies for developing countries equate: (a) economic growth with energy consumption, and (b) energy consumption with the production of electricity and oil consumption. An expanding and productive economy should be oriented towards the production of modern goods and services; therefore it required low cost commercial energy.

Some of these general assumptions on energy reflect fallacies resulting from inadequate information. In the case of firewood, millions of rural households do not have either the financial resources, or the education and training, or the capacity to change to other sources as cheap and as reliable as firewood. This source is regarded as a priceless commodity in monetary terms, and has at least two kinds of implicit values that can be accumulated but not quantified. The first is that firewood is free, and the second one is that value is related to the human energy necessary to walk, collect and transport fuelwood on an daily basis, on the understanding that there is something to cook, which may not be the case for people at the lowest levels of poverty.

The real reasons for deforestation derive largely from commercial logging, fuel production and large scale agriculture, etc., and do not relate to the understanding, voluntary action or decision of the rural poor women who collects the forest residuals.

Beside being a natural phenomena, erosion and leaching of soil nutrients are, together with the failure of water supplies, the major factors threatening agricultural productivity worldwide. "The problem is ecological, and our agricultural system is not designed to deal with ecological problems. The driving force of modern agriculture is not to conserve the soil resource; it is to exploit that resource in every possible way to produce maximum, immediate economic gain. The result is a fiercely competitive industry - a form of economic cannibalism -in which even the slightest concern for the resource is a weakness to be penalized."8/.

The lesson should be how rural poor women can recuperate their ability to husband and to cultivate the plants and food they need; what kind of energy and energy end-use devices they can use for domestic purposes which are smokeless, safe, efficient and as cheap as possible. This aspect should constitute a substantial consideration of the short and medium-term objectives, on the understanding that self-reliance is the main purpose of the long-term approach that could be based on a combination of energy supply systems primarily from biomass resulting from agricultural residuals or in combination with others produced by parallel and complementary groups.

The experience of biogas small farms in combination with chicken breeding, fish-ponds and growing vegetables already existing here in China, is of paramount importance as a possibility for achieving self-reliance with a long-term perspective.

Another example is related to a "Fondation Daniel Balavoine" which, through selling soap made with Karite nuts from Mali, participates in providing farming tools to farming villages in Mali using a long-term self-reliant approach. One advantage in the case of Mali could be the peaceful coexistence of diverse ethnic groups tied to specific traditional occupations such as farming, fishing, or herding, with an eventual biogas plant combining farming, fishing and herding activities where each group could be responsible for the specific activity for which a residual will be used for the biogas-combustion and energy generation for household purposes. As an additional benefit, the biogas plant could produce some biological fertilizers for farming and even as fish food, as in the case of Hongzhou chicken biogas farm.

Besides the advantage of this process, this approach can reinforce the South-South cooperation as part of UN operational activities, with active assistance of interested NGOs .

With regard to the unfounded general assumption on bioenergy, it should be noted that these fuels all originate from photosynthesis, and thus do not generate net CO2 emissions. In relation to energy efficiency, it is apparent that energy efficiency is a key strategy for development, as illustrated by the successes of fuel-efficient stove programs in many countries, reducing (a) the time requirements for fuel collection, (b) indoor smoke problems, and
(c) resource scarcity. In addition, efficient lighting technologies have proven valuable in rural contexts.9/

With respect to energy prices, it is widely acknowledged that most of these subsidies are directed to the relatively well-off. The poor need support, so it would be preferable to direct it to them exclusively. This would make energy prices reflect the cost.

Equating economic growth with growth in energy consumption ignores the fact that it is really energy services that are of interest; i.e. the benefits obtained through the use of energy in the form of lighting, cooked food, transport, etc. Energy strategies need to consider both energy supply and energy end-uses, and energy efficiency. Because energy costs are typically a small fraction of the total cost of manufacturing, it is not a requirement for manufacturing that energy be subsidized.

Another general assumption related to the ecological crisis is that rural poor populations generate pollution which eventually destroys the ecobalance.

In general, rural populations seem rather respectful of ecological rules, provided they still practice various forms of traditional farming. However, as rural poor populations do not benefit from the necessary infrastructure, nor services such as drinking water, sanitation and sewage collection or electricity, the environment is adversely affected. This could be the subject of a very illustrative analysis: why filth is correlated with poverty and underdevelopment, and why cleanliness is almost a privilege of the rich.

Another negative general assumption is related to the inability of the rural poor to look for solutions to problems; they are therefore considered an economic and social burden on their governments. However, inability and passivity are the first outcomes of ignorance, malnutrition and deprivation.

Because of their "hopeless propensity for large families", rural populations in developing countries are about to run out of food supplies. And yet the Brundtland Report states that "...the world produces more food per head of population today than ever before in human history. In 1985, it produced nearly 500 kilograms per head of cereals and root crops, yet amid this abundance, more than 730 million people did not eat enough to lead fully productive working lives .....there are places where large numbers cannot afford to buy food..."10/

The blessing of the Commons

The lessons and the objectives focus on the need for creating self-reliant mechanisms to provide energy and food on a sustainable ecological basis. The first contribution that rural poor women can provide is based on daily use of their energy and endurance, because in any rural poor family structure women eat last and eat least. They expend more calories in household-communal activities and take in less calories; they work more and rest less than anybody else, to which it is possible to add the traditional know-how and instinctive common sense to manage the meager resources they have, and an imaginative capacity to find and use either the fuel resources or the fuel crops, pieces of cloth, and to adopt even very primary health practices. All of this is a tremendous potential for self-assertion and therefore for self-reliance.

Rural poor women do not understand the underlying causes of the problems they face. The strategy to overcome poverty besides being remedial and action- oriented should incorporate micro-level programs for energy and food provision where different age sectors can have specific tasks and responsibilities according to their age, skills and social roles and authority.

Some comments on self-reliance

In the last fifty years of the development process, the solutions to current problems were the responsibilities of the central government and national institutions. However the gains and advantages, the problems of underdevelopment and impoverishment have increased, which is why we should consider that part of the solution should be generated by the local population itself, therefore reaffirming the need for self-reliance communities. The goal will be to bring the cohesiveness of cultural and traditional bonds of different groups to transcend overwhelming frustration and passivity.

Collective self-reliance can only function where there is group solidarity, one of the "blessing of the commons", combining the fulfillment of basic material needs with a sense of meaningful community. "Self-reliance seems to speak so much better to the human condition in all parts of the world than any other short formula in today's arsenal, or supermarket of potential slogans. It is because self-reliance as a method is entirely compatible with self-reliance as a goal. By reinforcing solidarity and social commitment and cooperation, self reliance has a sense of social purpose helping local population in meeting their basic needs in an equitable fashion".11/ 378)

"Self-reliance is often incorrectly taken to mean economic autarchy and cultural isolationism, when correctly it is a way to preserve cultural integrity, to prevent economic over-exploitation and to protect and maintain local environments". 12/

Notes

1/ World Commission on Environment and Development, Our Common Future (Oxford University Press, New York, 1987), p.1.

2/ UN Conference on Environment and Development, Agenda 21, chapter 1.

3/ Ibid.

4/ Ibid.. p. 114.

5/ As quoted in G. Hardin, Science, Vol. 162, December 1968, pp. 1243-48.

6/ M.E. Clark, The Search for New Modes of Thinking (MacMillan, 1989), p. 392.

7/ United Nations Development Programme, Human Development Report 1990.

8/ As quoted by M.E. Clark, op.cit., p. 110.

9/ Goldemberg, et. al., Energy for Development (World Resources Institute, 1987).

10/ World Commission on Environment and Development, Our Common Future, op.cit., pp.118-120.

11/ J. Galtung, Self-reliance (Institute for Development Studies, Geneva, 1980),pp. 363-378.

12/ Ibid., p, 420.

The Role of Rural Women in an Environmentally Sustainable Policy for Food Security

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Introduction

Over time, reflection on the problem of food security has become increasingly related to reflection on ecology and the protection of the environment against the aggression of modern civilization, after it was finally recognized that encroachments on the environment had reached a level that endangered the very survival of humankind.

This development, which acquired worldwide dimensions, may be attributed to the political power of the ecological movement in Western countries. Although this interpretation may be correct, the phenomenon is more profound. In the countries of the Third World, there existed until recently two complementary ways of tackling the question of food security. The "developmental" approach which emphasized the importance of economic development, particularly modernization of agriculture, for achieving food security for their people. In fact, the effects of this approach (at the social, economic and ecological levels) have aggravated the already precarious living conditions of large segments of the population and have even aggravated food dependency.

This situation has given publicity to "Food Aid" presented by the rich countries and international organizations. Although aid permits Western countries to buy a sense of self-satisfaction towards the great numbers suffering from famine in the world, food aid itself is very often misappropriated, rarely reaching its principal targets and deepening dependency.

Because of the short-comings of these two approaches, attention began to be diverted to the environment. Here the problem of the scientific status of this discipline becomes evident. While some are of the opinion that the objective is only to integrate the ecological dimension into the general problem of security, others believe that the "ecological principles may provide a conceptual framework for analyzing the social and moral aspects of the population problem and how to provide ample food supplies for the growing numbers of people". In the first case, efforts should be only directed towards the environmental effects of a system whose fundamentals and mechanisms are out of question (does this system really endanger nature?). In the second case, one may risk reducing the phenomena that require numerous determinations, under a single dimension.

Without entering into this debate, this paper will attempt to tackle the environmental problems caused by continuous efforts to provide food security and the possible role which rural women could play in contributing to the formulation and implementation of an environmentally sustainable policy of development concerning food production and security for the increasing populations of developing countries.

1. Food Security and the Environment

One of the major problems facing humankind at present is unquestionably the important issue of food security, which prevails throughout most developing countries. In Africa, for example, about one quarter of the population - more than 100 million people - do not eat enough for a productive working life. The problem is worsening. 1/

1.1 Constraints to Food Security

Efforts to achieve food self-sufficiency in developing countries - particularly in Africa - are thwarted by numerous constraints. One of the main problems faced in achieving adequate food production is the loss of productive land through land degradation, also known as desertification, which is a continuous process of reduction of the biological potential of the land due to insufficient rainfall and over-exploitation by people. Common examples of the latter are "slash and burn" agriculture, overstocking of domestic animals, unsustainable cutting of fuelwood (deforestation) and inappropriate cultivation of marginal land. All this leads eventually to soil erosion and declining fertility. When this process continues, lands approaching those of the desert are created. This process is going on in all regions of the world today, including Europe and North America. It is most serious in Africa. 2/

1.2 Food Security and Environmental Damage

The greatest cause of deterioration of natural resources in developing countries is poverty - under which millions of people must eke out a meager living to ensure their survival. Poor farmers, fishermen and herdsmen are not necessarily less resourceful or less aware of the need to preserve their environment than their counterparts in wealthier countries. It is their desperate struggle for survival which compels them to adopt environmentally unsound and unsustainable practices.

1.3 Environmental Costs of Food Production

Information about environmental costs is limited because these costs are typically not quantified. Their costs include erosion damage to rivers, lakes, reservoirs, harbors and coastal areas; the effect of fertilizers carried by eroded soil and runoff which stimulates eutrophication of water bodies; human illness, death and damage to ecological systems due to pesticides; loss of valuable plant and animal habitat through deforestation and drainage of wetlands; increasing soil and water salinity associated with irrigation, etc.

2. Food Security, Rural Women and the Environment

Many rural women, though illiterate, can see the environment from their own perspective and would be able to provide acceptable solutions to their problems. The rural woman plays a dual role in society. As wife, mother, educator of her children, and frequently de facto head of household, she faces a severe problem in her role as a productive member of the agricultural force, as she toils unpaid and unacknowledged. Her status in both roles can be strengthened through the resolution on Women and Food. Through its full implementation, she will be able to make a full contribution to the development process.

2.1 The Role of Rural Women in Food Production

Rural women play a vital role in meeting food/nutrition needs throughout the world. In developing countries, women provide 40 to 60 percent of agricultural labor, and they make many decisions relating to food production, which are vital to both family and national welfare. In subsistence agriculture, women make the decisions on what to plant, and when and how to plant, while in the market economy, the nature of decision-making and division of work are determined by access to resources and skills which are dominated by the male head of the household. This fact explains the low economic status of women in modern commercial agriculture and the types of jobs assigned to them.

Traditional agriculture in some developing countries is faced with a crisis for several reasons: the fact that state agricultural policy is clearly biased in favor of commercial agriculture and large agricultural schemes; and environmental degradation. In such situations, the male population seeks employment in large agricultural schemes Consequently, the current economic crisis in many developing countries is causing changes in the household gender division of labor in many rural communities, particularly those where women were previously excluded from agriculture, food production and other public work.

Another important factor which has affected women's role in food production relates to natural disasters. Drought, which has affected a number of countries particularly in Africa, has had a drastic effect in terms of ecological degradation, and has brought about fundamental changes in the human environmental landscape. Most of the communities in the affected countries have deserted their land, and mass migration towards urban centres have occurred. Women cultivators have been severely affected by the onset of drought and desertification. The combined effects of these factors have drastically decreased land productivity over the past decade.

2.2 The Role of Women in the Protection of the Environment

Research has shown that women have not benefitted from the modernization of agriculture, and that when technical development has lead to the improvement of tasks undertaken by women, these tasks are taken on by mend. On the other hand, when a new technique becomes monotonous or difficult to apply, it is given to women. This has meant the development of technology for the sake of technology, or for the sake of real or symbolic power conferred by technology, independently of the desired objective - the survival of humankind and the improvement of human well-being. The result has been that while new agricultural and food technologies are being developed and increasingly used in food industries, far greater numbers of people are living in dire need.

For women, technology has meant deprivation. Contrary to men, women remain nearer to nature and more sensitive to its deterioration and destruction. The question is - who takes into account women's point of view when new agricultural or food policy is established, when new products are developed at the expense of the old, or when new techniques are developed for preparing and presenting food at the market? It is women who are responsible for feeding their children and for preparing food for their families.

3. The Participation of Rural Women in Food Production

It is unfortunate that development projects in rural areas - particularly those relating to food production - do not always take women's time into consideration. Women are responsible for the reproduction and maintenance of human capital, neither of which are recognized as economic activities and are therefore not enumerated. Since women earn no wages or less wages than men, which is often the result of the belief that their labor is not of great value, no attention is paid, nor calculations made, of the value of their participation in development projects.

3.1 State Policies Towards Rural Women

Rural women are caught in a double bind. As part of the rural population, they suffer from the general neglect and pro-urban bias of national governments. As women, they suffer from marginalization at the policy level, from which a large proportion of women in developing countries suffer. At present, very few strategies in developing countries are calling for the effective and rewarding participation of women in agricultural and food production. These strategies reflect little understanding of the role women have traditionally played in the food cycle, and they fail to take advantage of the contribution women can make to national development effort. In some developing countries, planners and policy-makers have used Western traditions as models for agricultural development (e.g. giving land titles only to men and designing extension services and production credit systems primarily for men), and they have deliberately developed policies and programmes to remove women from productive activities in the food cycle.

In some developing countries, where women were traditionally responsible for the family food supply, the cultural balance between male and female decision-making has been upset, with a consequent reduction in the availability of food and an increase in hunger. In some countries, women (particularly from among the agrarian poor) have lost of much of their earlier productive power and they have therefore lost an element of control over their own destinies.

3.2 Constraints to Rural Women's Participation

Rural women face a number of constraints which limit their participation in food production and food security. Some of these are described below:

A. Land Ownership

Poor and landless women who clearly constitute the majority can have access to land either through land reform, land reclamation schemes or through inheritance. Yet there is discrimination against them. In land reform and land reclamation schemes, land is distributed to male heads of households and registered in the name of the husband as head of the family. Studies relating to the situation in Egypt show that the great majority of female rural labor force is in wage labor (73 percent), and only 26 percent actually own land.

B. Technology

The lack of rural women's access to technology to assist them both in agricultural production and in their households, has been a problem recognized both by women themselves and some planners. The low level of technological development and of productive forces constitute a crucial impediment to rural development.

C. Extension and Training

Numerous studies have shown the need for extension services for women, especially in areas where women dominate food production. Most extension programmes do not challenge existing conditions of segregation between sexes; nor do they recognize the special and important role played by women farmers. In fact, in many countries, efforts at modernizing agriculture have completely bypassed women, particularly where women have been denied access to extension services. From a review of a rural development projects which includes extension services for both men and women, the following was noted:

1) Rural women are largely dependent upon their male relatives for the acquisition of production resources and for the dissemination of local knowledge;

2) Social and religious factors restrict women's attendance at extension meetings conducted by male extension agents;

3) Technical aspects associated with the design of communications and methods of contact restrict women's attendance at extension meetings conducted by male extension agents;

4) In the case of the project's female farmer, response to production resources such as credit, animal traction and irrigation pump is almost non-existent, although positive response has been shown to more easily manageable resources such as improved seeds and chemicals.3/

D. Credit

Rural women experience many of the difficulties normally encountered with regard to formal credit sources, such as bureaucratic loan procedures, difficulty in completing forms, elaborate and complex loan procedures, and other time-consuming formalities. Rural women are further constrained because of their higher illiteracy rates and lower levels of education. Time poses another difficulty for rural women who are required to undertake numerous tasks - income-earning activities, housework and child care. In most developing countries, it is extremely difficult for women to receive loans from banks or savings institutions, since they are considered as poor risks.

4. Recommendations

It is impossible to conceive rural development projects in developing countries - particularly in the field of food production and with due consideration to the environment - without the active participation of women. They already provide a major part of the labour force and are involved in all sectors. Yet it is clear that women's interests and needs are not always taken into account; nor is the most effective use made of women's capabilities.

In order to improve the ability of developing countries to meet their food needs without destroying the environment, women must be recognized as cultivators and given equitable access to land, credit, extension services and tools, as well as to cooperatives and other rural workers' organizations.

4.1 General Recommendations

It is clear that there is no single measure or measures which should be taken with regard to women in the field of food security. What is needed is to put an end to traditional attitudes towards women. The first measure required is to give women an opportunity to express their opinions, and to enable them to express themselves without oppression, both socially and with the mass media. Women must now learn to speak for themselves, acquire self-confidence and the ability to convince and be convinced. Yet it is not enough to consult women. They must also be able to exercise their skills and use their knowledge.

Recommendations are also needed relating to the collection of quantitative data that can be used in evaluating the level of food security and allow for sound decisions in terms of food policies and strategies. Meeting one's own needs through the consumption of one's own agricultural products, without passing through market channels is wide-spread in few developing countries. But with the development of markets, the margin of satisfying one's own needs has decreased and even disappeared. This has led to a state of food scarcity, when people's incomes are insufficient, without taking them into account in statistics. It is women who are in most cases responsible for all tasks related to subsistence agriculture. It is therefore necessary to know whether the decline in women's employment in agriculture observed in certain developing countries means a real dissociation of women from agricultural work or whether this implies the concealment of other activities not reflected in statistics. In the latter case, what is the real volume of production generated by these activities? And are they sufficient to cover the food needs of those depending upon them?

4.2 Changing Policy Directions

Without major changes in the strategies followed by developing countries to assure the food security of their increasing population, there is little hope for decreasing the drudgery to which so many poor women, particularly in rural areas, are subjected, or for lessening the incidence of hunger and malnutrition and of environmental damage caused in efforts to provide food. New policies and projects are needed to integrate rural women into development policy. There is a need to effect changes in state ideology to bring about greater recognition of the importance of rural women as producers, and to integrate women into current and future development efforts.

If these changes are to take place, we must know and let governments know what it is that women do, the range of their activities and the amount of time they have at their disposal beyond that taken up by their tasks. It must also be recognized that integrating women into development is directly related to other development issues such as food security, population, education and protection of the environment.

There are, moreover, other suggestions which should be carried out in the context of overall policies aiming at effecting major changes in the structures of rural areas.

It is essential to select women as a particularly vulnerable group requiring urgent policy intervention. Studies should be carried out on rural women, with the aim of collecting up-to-date information on changing characteristics of rural women, using creative methodologies which can best capture the different types of work carried out by women, and under which conditions. We have already pointed to the lack of studies and the often contradictory information they provide, especially when we compare micro-level studies with results obtained from national censuses.

Short "crash" courses/training should be carried out for planners at all levels, with the aim of raising their awareness as to the important roles played by rural women, and how they can be incorporated into development efforts, making use of data from such studies and surveys.

There are certain efforts that should be made to facilitate the participation of rural women in the provision of food security. These relate to the following issues:

A. Education

The unequal access of rural women to educational services is obvious in most developing countries. Major actions suggested include all those that will portray schooling as an attractive and viable alternative for rural women.

- School curricula should be up-dated to make them more relevant to the realities and needs of rural women and their productive roles in agriculture.

- Attempts should be made to make school schedules and attendance compatible with agricultural work.

- Rural day care centres should be established, to alleviate the burden of child care, on young women so that they can attend school.

- Legal bans on the full-time employment of rural children should be enforced.

- There should be greater emphasis at the policy level on expanding primary education for women, to alleviate the problem of female illiteracy.

B. Production

Two problems have been identified with regard to women's roles in this area, which must be addressed. The first relates to the tremendous burdens on women and the second derives from low levels of productivity and resulting low levels of income, from which comes the continuing cycle of poverty. Actions in the area of productivity must address both these problems.

The first problem might be at least partially resolved through improvements in services, such as in the provision of water and electricity which would automatically reduce the time and burden on women of fetching water and fuel. In relation to productivity, governments should support rural production through the provision of incentives, transport and marketing facilities and storage facilities to encourage the production of food and to ensure access to food through pricing policies and through appropriate means for achieving equitable distribution. The following measures might be suggested in relation to lack of access to land, technology, credit and extension:

1. Access to Land

Women should be allowed greater access to land, and measures should be taken so that women are not denied land, or lease of land. Land should be registered under the names of both husbands and wives.

2. Access to Technology

(a) Appropriate production technologies should be provided to women farmers, together with training in the management and maintenance of equipment and tools.

(b) Women should be trained in the use of technology and in up-grading traditional conservation and storage facilities.

(c) Care should be taken in introducing new technologies in terms of their potential effect on the division of labour by gender.

3. Access to Credit

(a) Women should be encouraged to seek title to the land they farm so that it can be used as collateral for credit.

(b) Creative methods should be identified for reorienting and/or amending laws and policies governing the flow of credit, so that women can have opportunities for obtaining credit.

(c) Credit projects should experiment with various alternative means of guaranteeing loans so that women who do not have collateral are not excluded.

(d) Informal credit systems should be supported so that they can operate in the absence of formal credit schemes.

4. Access to Extension and Training

(a) Extension should be reorientd in such a way that training raises awareness of the importance of the role of women in rural production.

(b) Women should be encouraged to join agricultural technical institutions so that they can work in rural areas.

(c) Extension and training through the mass media should be encouraged.

(d) Extension courses and communications should be included in school curricula, literacy material, etc.

Conclusion

If all people in developing countries are to meet their nutritional needs without damaging the surrounding environment, there must be a role for all disciplines, interest groups and individuals; women must be involved as equal partners with men in the process of development.

Notes

1/ "Caring for Forests in a Changing World". C.H. Murray. Food Policy, Volume 16, No. 3, June 1991. P. 215.

2/ "The Food Crisis and Environmental Conservation in Africa". Daniel Stiles and Ross Brennan. Food Policy, Volume 11, No. 4, November 1986. Pp. 398-310.

3/ "Rural Women's Access to Production Resources in Sudan with Special Reference to Jobel Marra Rural Development Project". Abdalla Yahia Adam. Khartoum. 1989.

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The Problematic of Arab Women between Culture and Technology

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The literature of development is full of discussions on the role of technology and culture in the process of comprehensive development - something which assists in identifying the relationship between culture and technology within the Arab society. This relationship represents an extremely significant issue due to the intermixture effects of both in this society.

In addition, this relationship points out some other different cases in the Arab area on the intellectual, applied and occupational level. An example of these cases could be the problem of the adaptability of some technological techniques in production and consumption in Arab society in general, and the rural sectors in particular. Also, the issue is related to cultural policy and its relationship with the urban and rural technological advancement. There is also another case which has attracted considerable attention in the past few years which is that of the relationship between culture and technology generally within Arab society and within the rural sector in particular.

The role of women in technology projects means the study of development and social change. In other words, tackling the role of women in development experience is not a feminist subject, because I suppose that woman takes part with man in changing the underdeveloped aspect of their societies; also, she has a specific role in liberating her position from the restriction of rules which distinguish the position of women in developing and Arab countries. Generally speaking, studying the role of women in development experience means studying the social reality of her society, history and problems which are caused by the rapid social change.

The Woman's Role in the Experiment of the Bio-Gas Technology is a review of the findings of our study of the woman's role in the experiment of the bio-gas technology in the Yemen.

The bio-gas technology has a material, social and cultural impact and effectiveness on the status and role of the women in the village. But the bearing and degree of this effectiveness have varied from the material aspects to the social dimensions. This can be maintained within the framework of the positive attitude of the village community - both men and women - towards the bio-gas tachnology project since its inception.

This can be due to the fact that the project, per se, is concerned in the first place with the material physical dimension of each inhabitant of the village, the man and the woman, and that the cultural and social dimensions are subordinate to the material dimension.

Role of Women (Education and Awareness) in Environment Protection

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Abstract

Developing countries, especially urban areas, are suffering from environmental deterioration which has levied its toll on women as well as the rest of society. As women are responsible for providing the food, water, sanitation and energy for the whole household, it is urgent to ensure their environmental education in order to educate future generations, politicians and decision makers to consider environment and development as two synergizing key factors for sustainable development. The role of NGOs, governmental and international organizations in support of women's education and awareness of environmental protection issues is also discussed.

Keywords

Women, water, sanitation, energy conservation, occupational hazards, impacts on children's health, role of NGOs, governmental organizations, international agencies, education, participation.

Introduction

Development and environmental issues are no longer considered as separate, as they continuously affect and interact with each other.

Developing countries are now in process of realizing these interactions, and emphasis should be given to educating new generations about the environmental and socio-economic impacts of development in all aspects of human life.

Women in developing countries are getting more involved as a work force at several levels of decision making and programme execution, in addition to their natural role as mothers and house wives.

Now, it is a well established fact that when women are educated, the whole society is educated. Involving women in environmental problems and proposing means of controlling these problems has become a must to halt the ongoing process of environmental degradation and, consequently, the deterioration of human welfare.

The majority of developing countries are suffering from high population densities and crowding in their urban areas due to lack of proper city planning as well as the encroachment of industrial activities in residential areas, in addition to the environmentally deteriorated squatter areas. This situation has limited the extent of health socio-economic impacts on people living in these urban areas.

Women have traditionally been assigned most domestic roles, such as giving birth, cooking, feeding, and disposing of waste. In most traditional societies, women are the drawers and primary users of water. Technological changes, however, can exert pressure on these traditional roles and cause a decline in sex stereotyping, thus paving the way for broader women's participation in developing their communities.

Understanding the implications of environmental pollution on the choice and protection of food, water, housing and the work place is the basic factor of which women should be aware, to protect themselves, their families, and new generations.

Participation of women in industry has lead to their exposure to various occupational hazards, which affect them and their offspring, causing irreversible health damages. Through proper education, these effects could be minimized with consequent protection of new generations.

The role of women in energy conservation cannot be neglected; women can be directed to economize on their energy consumption and decrease the extent of environmental deterioration through increasing their knowledge of environmental problems related to energy problems. Improving women's understanding of proper ways of refuse disposal, and handling and disposal of liquid waste can greatly improve the health of their families and their societies in general.

Women by nature are responsible for the cleanliness of their households. Expanding their awareness of proper hygiene both at home and on the job can improve the health of the community as a whole.

Women and sanitation

Environmental deterioration as depicted in water pollutants is badly affecting the health, wealth and welfare of societies living in both urban and rural areas.

It has become increasingly obvious in recent years that improving water supply and building pit latrines do not by themselves make people healthier, although this is the ultimate goal of most such projects (Borne, 1984).

After a review of more than 550 water and sanitation projects, the International Water and Sanitation Center, IRC, concludes that "although many project documents and policy papers stress the need to integrate hygiene education in the planning and implementation of water supply and sanitation projects, inputs are often limited and many programs suffer from being inadequately planned, funded and implemented (IRC, 1988).

A recent report on environment hygiene in SIDA-supported programs in Africa also emphasizes the relative neglect of sanitation and health education in environmental health, with poorly balanced intervention programs and modest health benefits as a result (Nordberg and Winblad, 1988).

A successful case of involving women in the planning and implementation of environmental health improvements is reported by Waithaka and Kingori (1990).

Kenya's Ministry of Health, through its Division of Environmental Health, has recently stepped up its support to households and communities in the field of basic sanitation and water supply improvement, as have international organizations such as UNICEF and SIDA, which in the last two years has been assisting in improving water supply and sanitation in Eastern Province. The role of women and of local artisans is prominent in the planning and implementation of the project. In Kenya - as in most developing countries - women traditionally had little say in decision-making at the community level and above. They have so far played an almost exclusively domestic role, but this is now changing, particularly in a growing number of households where women are the heads of households. But with improved basic education and with husbands frequently absent for urban employment, the general tendency is for rural women to become more independent and more confident in taking decisions for children, generally the drawers of water and collectors of firewood. Responsibility for good environmental hygiene has, therefore, mainly been shouldered by the women in the family. The following describes the project's activities with special emphasis on the activities in which women and local artisans have been involved.

Small-scale water supplies, including protection of traditional water sources such as springs and hand-dug wells. Also included are roof and rock catchments where water jars and ferrocement water tanks are constructed for storage of the water collected.

Sanitation, such as construction of ventilated improved pit (VIP) latrines and upgrading existing latrines to VIP standards by improving floors and inserting vent pipes with flyscreens.

Vector control, which mainly consists of drainage, bush clearing, etc. Only small amounts of insecticides are used and only where necessary.

Women were the crucial target group tackled by the project administration. The tasks undertaken by women were:

1. As agents for replication of latrines with local materials.

2. As trainees and trainers for hand pump use, assembling and disassembling for maintenance.

Polissar (1984), conducted a case-control, interview-based study of the risk of developing cancer from asbestos in drinking water. The Everette, Washington area was selected for the study because of the unusually high concentration of chryotile asbestos in the drinking water it draws from the Sultan River (200 million fibers/liter). Through a population-based tumor registry, the authors identified 382 individuals with cancer of the buccal cavity, pharynx, respiratory system, digestive system, bladder, or kidney, diagnosed between 1977 and 1980. These individuals or their next-of-kin were then interviewed. The authors conducted similar interviews of a control group of 462 individuals. Finally, the interviews were validated in several ways, including comparing the collected data with that from secondary sources. Estimates of exposure to asbestos in drinking water were based on residence and work place history, and on individual water consumption. Four different measures of exposure were used. Cancer risk was estimated by logistic regression and other methods. The authors found no convincing evidence of cancer risk from imbibed asbestos. Exposure was similar between cases and controls. Confidence intervals for relative odds for almost all sites included unity. Out of 84 dependent estimates of risk by sex, site, and exposure measure, 63 indicated a protective effect and 21 indicated an increased risk. In instances where relative odds differed appreciably from unity for both males and females, the effect was protective. The relative odds of cancer for 20 years of exposure to Sultan River drinking water varied from 0.92 to 0.99 for females and 0.82 to 0.01 for males for all study sites grouped. For cancer of the digestive system, the corresponding range was 1.03 and 1.08 for females and 0.85 to 1.00 for males. There were six statistically significant associations ($P < 0.05$). All involved male stomach (eight cases) and male pharynx (four cases), and indicated elevated risk. This number of significant associations is close to that expected (for the number of comparisons made.)

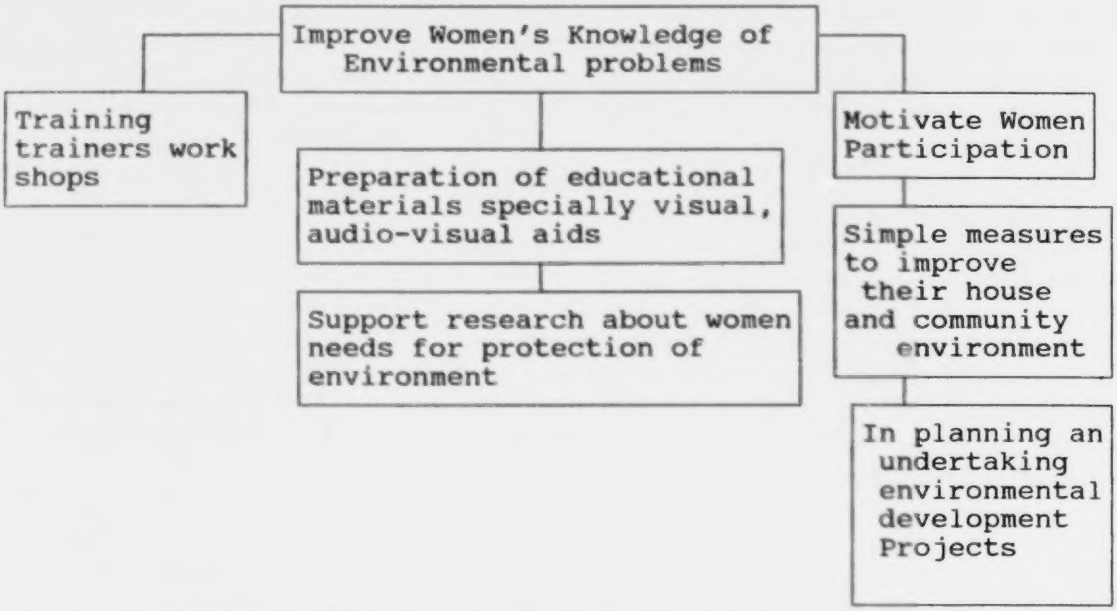
Butz et al (1984) studied mothers' recall data collected in Malaysia in 1976-1977 and analyzed its correlation to the mortality of 5471 infants. Respondent population is 1262 women living in 52 primary sampling units of Peninsular Malaysia. Lengths of unsupplemented and supplemented breastfeeding and presence of piped household water and toilet sanitation are more related to infant mortality than is type of water supply. The effects of breastfeeding and the environmental variables are shown to be strongly interactive and to change systematically during the course of infancy. Breastfeeding is more strongly associated with infant survival in homes without piped water or toilet sanitation. In homes with both modern facilities, supplemented breastfeeding has no significant effect, and unsupplemented breastfeeding is statistically significant only for mortality in days 8-28. The presence of modern water and sanitation systems appears unimportant for mortality of infants who are breastfed without supplementation for six months.

Anticipated role of local non-governmental organizations

Surveying women's non-governmental organizations in Egypt and in several other countries such as USA, Greece, Poland, France and others, showed that their contribution to strengthening the role of women in improving the sanitation and protection of environment is somewhat lacking, if even considered. This indicates the urgent need to start planning for the role of NGOs to be more positive and implementable.

Women make up more than 50 percent of different rural or urban communities, which is often overlooked. It is becoming increasingly urgent to motivate women to participate and undertake their expected role as:

PROPOSED PLAN OF ACTION


Improve Women's Knowledge of Environmental problems
Training trainers work shops
Preparation of educational materials specially visual, audio-visual aids
Support research about women needs for protection of environment
Motivate Women Participation
Simple measures to improve their house and community environment
In planning an undertaking environmental development Projects

1. Acceptors of existing water services and sanitation customs.

2. Users of new water and sanitation facilities.

3. Managers of household and community water resources and socializers in sanitary practices.

4. Agents of change in breaking the fecal-oral route of infection through better use of water and sanitation facilities (Elmendorf, 1981).

5. Conservers of natural resources through proper handling of food, water, and energy, with full understanding of their impacts on environmental deterioration.

6. Protectors of the community and family from exposure to chemicals, pesticides and air pollution hazards.

7. Teachers of new generations about the global, national and local environmental deterioration and their effects on people and the economy.

8. Participants in planning projects, involved in upgrading community environmental health and sanitation.

9. An interested and available half of society, ready to improve health standards of living for the family and community if they can receive proper attention and education.

The above-mentioned women's role in protection of the environment should be supported by NGOs as well as governmental and international organizations.

The role of NGOs should be seen as an active agent in improving women's understanding and awareness of the interlinkages and their immediate impacts on the economy, welfare and health of the community.

Women are more vulnerable to the impacts on health of environmental pollution. Their health problems affect them and the whole family.

Air pollution for women in villages in India villages has been studied in detail by Smith et al (1983).The women were exposed about 2.3 hours per day to average concentrations higher than the severe pollution level in London in 1952 (UKMOH 1954) and more than 50 times higher than the WHO recommended air quality value for short-term exposures (WHO,1987). This exposure will lead to a considerable lifetime risk (3.6%) for lung cancer based on the WHO quality guideline (WHO 1987).

A study by Neuberger and Friedl (1984) showed that cancer incidence and death due to cancer were higher between women than men exposed in Austria due to the presence of an asbestos cement pipes factory in the vicinity. The same observation was found between the women and men working in the plant.

In another study by Hanafi (1978) in Alexandria, Egypt, it was noticed that incidence of chest allergy and chest disease in Alexandria, Egypt, was higher between women than men, especially during puberty and menopausal ages when they are physiologically more vulnerable, and exposed to air pollutants in the heavily industrialized governorate.

Severe health implications can be expected on exposed women in developing countries where women are much poorer, undernourished and exposed to more severe environmental pollution caused by low sanitation levels.

NGOs should help women in rural communities in breaking their isolation from the rest of society and in understanding proper ways of dealing with farming and rural practices and of protecting themselves and their families from rural environmental pollution problems, e.g.: pesticide exposure, fecal to mouth infections, refuse handling, wastewater disposal, cleanliness, etc.

NGOs can act as leaders in demonstrating environmental promotion projects, e.g.: cleaning a sector of a village through proper collection of garbage and sweepings of streets, demonstration of proper handling of food, saving of energy by introducing biogas burners etc. This would introduce applicable, accepted, simple, low-cost environmental protection measures in rural areas where they are most needed.

NGOs can concentrate part of their efforts on raising funds to support research efforts exposing the health risks to which women are subjected while working in different industrial activities. Most of the published data on this subject concentrate on males, while they seldom address the same effects on women working in similar industrial conditions. This used to be accepted in the past, but with an increasing number of women involved in industry, this attitude must be changed, and recorded health impacts included in the literature.

A great number of women are dealing with assembling of electronic equipment and metal soldering. A research carried out by Richard et.al. (1984) proved that Cadmium concentration was double in the hair of new born babies of mothers exposed to Cadmium while working with soldering, as compared to babies born for mothers of different types of jobs as secretaries, nurses, doctors or teachers.

In another study by Yakushiji et.al. (1980) it was found that babies born of mothers working in an electric condenser manufacturing plant have a higher concentration of PCBs in their blood, 10-100 fold the concentrations found in babies of mothers not exposed to such a highly carcinogenic material. Those babies were suffering from fever, red eyes, skin sensitivity and weak tooth formation.

To explore possible etiologic factors of childhood leukemia, a case-control study was performed in the Netherlands. Cases were selected from a complete nation-wide register of cases of childhood leukemia which were diagnosed between 1973 and 1980. Controls were matched with cases for year of birth, sex, and place of residence at the time of the diagnosis. Information about possible exposure were collected by a questionnaire addressed to the parents. This report concerns the results of the analysis of parental occupations and occupational exposures for 519 children with acute lymphocytic leukemia and 507 controls. During pregnancy, more mothers of patients were working in "hydrocarbon-related" occupations; relative risk (RR) = 2.5 (59% confidence interval (CI) = 0.7- 9.4). Likewise, greater occupational posture to chemicals (paint, petroleum products, and unspecified chemicals) during pregnancy was found for mothers of patients (RR = 2.4, 95% CI + 1.2-4.6). This kind of work being performed by the mothers one year before diagnosis did not differ between cases and controls. For the fathers, no relationship was found between a hydrocarbon-related occupational exposure to chemicals and leukemia in the offspring. Adjustment for birth order, social class, and degree of urbanization did not materially change the relative risks. (Van Steensel et al 1985).

Dorch et.al. (1984) in a case control study carried out in Mount Lambier in Australia found that women who consume principally ground water had a statistically significant increase in risk of bearing a malformed child (RR=2.8) when compared with those drinking rainwater. Statistically significant increases occurred specifically for malformations of the central nervous system and musculoskeletal systems. Reanalysis of the data by estimating water nitrate concentration demonstrated a nearly threefold increase in risk for women who drank water containing 5.15 ppm of nitrate and a fourfold increase in risk for those consuming >15ppm of nitrate.

Strategies for the education of women as effective users of water, food, energy and sanitation facilities

New knowledge resulting from education or training must be related to local cultural behavior as well as social and religious beliefs. Successful education and training must be developed through linking the good practices of the past to the new ideas. Hygiene education, particularly personal and household hygiene, should focus primarily on women with the following objectives:

1. Increase knowledge of water health and environmental pollutants of water/food/health relationships.

2. The promotion of positive attitudes toward proper and hygienic use of the water, food transport vessels, storage receptacles, the use and care of latrines by women and their children, with the basic idea of using locally available materials.

Study of two Egyptian provinces revealed that families preferred to use the same water for washing clothes, then vegetables, and finally dishes. "It is not so much the reuse of this water that is detrimental to health as the scarcity of water and the arduous task of its transport. (Simpson Herbert, 1979).

Role of governmental agencies

Governmental bodies, especially in the developing world, should:

1. Include strategies to develop human resources at the community level to meet local needs, with emphasis on the role played by environment on development and the impacts of developmental projects on environmental degradation that can take place if those impacts are not addressed while planning those projects.

2. Ensure equal access for women to training in maintenance, management and technology of water sources and supplies.

3. Ensure that women are included in planning for any environmental education programs and a tailored program for them must be held to train them as trainers of other women trainees, whether at job or household levels.

4. Promote and ensure the participation of women in local councils and planning boards responsible for making decisions on community water supplies, garbage and refuse collection, environmental protection, health and primary health care.

5. Different governmental bodies should support television and mass media programs each in their respective domains concerned with environmental pollution control and their expectations of women and men to participate in maintaining the success of those projects.

6. Insist on the inclusion of an environmental impact assessment for every project and undertake proper studies on the environmental management of already developed projects, while taking women's evaluation and perceptions fully into account.

7. Collect accurate statistical information about the women's work force to recruit them for the environmental development of governmental projects and to improve the participation of society in accepting the changes.

8. To achieve these goals, proper environmental training for those working women must be given strong consideration and support from different governmental training centers.

Role of international organizations

International environmental organizations, the United Nations and its specialized organizations have a very important role in encouraging women to play their role.

International organizations must always motivate countries and their governmental agencies to accord sufficient importance to the role of women in environmental development.

International organizations have always been the stimulators of developing countries to establish their goals, modify their plans, help countries in fund-raising and in obtaining loans to start their development and health projects.

They have also helped in all areas of human need to train and upgrade the capabilities of human resources. They always set examples, to be followed by the governmental bodies of their countries.

It also expected that international organizations will help in technology transfer and in disseminating communities' experience around the world, where women have been actively participating in projects aiming at improving the welfare and health of men, their families, and societies.

This can be achieved by organizing more meetings, support projects to improve environmental health through women activities, and, most important of all, to send the message around the world through telestars and visual mass media.

Conclusions and recommendations

1. Women must be motivated to undertake their expected role in environmental protection, starting from taking simple hygienic measures to protect their water, food supplies from pollution. They must participate actively in resource conservation and minimize all forms of waste.

2. Non-governmental organizations (NGOS) must play a highly positive role in raising the awareness of the society about the importance of women's role in protecting the family and community from devastating environmental problems.

3. NGOs must motivate and assist women in learning more about environmental problems and in increasing their level of awareness of solutions which can be undertaken at different levels of women's education.

4. Governmental bodies can improve the level of women's awareness of the sanitation projects as well as insist on women's participation in preparing environmental impact assessments for developmental projects as well as recruit women's work force in planning and decision making regarding environmental issues.

5. Governmental organization should disseminate environmental education through all their human resource development programs, with emphasis on the role expected of women as mothers, teachers and members of the work force.

6. International organizations should set a leading example for women, by organizing more international and national meetings where women's involvement can be more strongly supported.

7. Women should be considered in the allocation of funds for research grants, jobs, and travel to meeting to help the lower income groups of society to participate and undertake their role in environmental protection.

8. International organizations should allocate funds for environmental protection and for development, with emphasis on women's participation.

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Role of Funding Agencies in Support of the Sustainable Role of Women in Environment

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The political, economic, social, cultural, environmental, scientific, and technical changes of the past two decades have created an entirely new context for developing countries. Several major groups of changes characterize our times, each of which forces us to rethink our ideas and concepts. We need to change the way we visualize the process of development, particularly the roles that research and knowledge can play for women, the half of the world population that has been neglected as an active resource for development.

Population growth has resulted in an increase in rural-urban migration. Rapid urbanization has created demands for housing, sanitation, transportation, and energy supply. This adds unmet urban needs and widespread urban poverty to the deprivation that characterizes rural populations throughout most of the developing world.

Over-population also leads to unemployment and underemployment which have emerged as two of the most troublesome and dangerous phenomena in developing countries. The impacts of those anti-developmental factors are even more severe on women in both the rural and the urban poor areas.

Environmental sustainability has become the most significant aspect of planetary interdependence, applying with equal force to all countries, irrespective of wealth, geographical position, or political system. Lifestyles, resources use, and production systems will have to change in all countries if the challenges of sustainable development are to be met.

In addition, there are cultural and environmental changes that must inform and influence our thinking about development. Among the most pervasive of the many cultural transformations currently under way is the growing importance of religious values, ethnic allegiances and the rise of fundamentalism. In several parts of the world, these phenomena constitute the predominant influence on the lives of people and communities. They are often complicated when the wish to preserve cultural identity comes into conflict with the tendency of the mass media to promote a "foreign" culture.

In certain preserved cultures these attitudes can hinder the promotion of women in playing their role in sustainable development and environment protection.

This will involve additional efforts on the part of funding agencies to demonstrate the importance of associating women in the development process to maximize societies' gains.

Donor funding of research for development has increased very significantly over the past two decades, as has the number of agencies involved in such funding. The total amount of external support for research in developing countries has grown considerably and is now estimated at US$2 billion.

On the recipient side, many more international, regional and national research centers exist today than was the case even a few years ago. The number of international and regional research centers in the South increased from 140 in 1970 to more than 200 by 1990. There has also been a notable increase in the capacity to undertake research at the national level in developing countries. (IDRC, 1991).

Much more research devoted to the impacts of environmental degradation on sustainable development and on women as one of the most affected population groups, should be supported by the donor organizations and funding agencies. Research in modern technologies to ease the work- load carried daily by women should be thoroughly considered and funded as one of the neglected areas. This will help women to utilize more of their time for income generation and infant care.

Impacts of the new technologies on information dissemination

The changes of the past 20 years have been dramatic, and the pace of change continues to accelerate. What, then, are the implications of this radically different context for the development process, for developing countries and funding development agencies?

The first implication is the need to change our way of thinking about development, in a way that it cannot be imposed from outside. Development should mean above all giving people the power, defined in terms of adequate knowledge and capacity, to decide what is best for them, and to act accordingly in fulfilling their own destinies.

In applying those same new definitions when thinking of involving women in an active participatatory role in environmental management, one must also consider the social barriers inherent in different societies which have to be handled very carefully if the anticipated development is to be achieved. Neglecting women in the design and execution phase of so many developmental projects supported by foreign funding agencies, has led to the failure of those programs. The major cause of this failure is the perception on the part of the recipient community that it is an imposed technology which does not respect national traditions and beliefs. Women's role is vital in the process of introducing any new developmental values or habits, new or even contradictory, to the old beliefs of the served society.

The knowledge gap is one of the basic factors in comparing developed and developing countries. With emerging new technologies, the dissemination of information has become easier. Educating women and raising their awareness about their role in protecting themselves and their families from environmental assaults so common and variable in developing countries is becoming more achievable.

Funding agencies will be confronted with the growing need to spend and sponsor more educational programs in support of the role of women in development and environmental protection, which are inseparable from each other.

It is time for all members of the international development community to marshall conceptual, methodological, and technological initiatives in the theory and practice of social, economic, and political change, so that they can be placed at the service of development efforts.

Progress in telecommunications, microelectronics, and modelling tools has make it easier to acquire and exchange information, to experiment with the impacts of alternative policies and decisions, and to disseminate ideas and communicate with the public at large. This will ease the process of introducing the concepts of involving women in development to those unwilling to change society. This is an other area where funding and development agencies should intervene to speed up the process of sustainable development.

Funding agencies in support of women role in sustainable development, and environment conservation

Funding agencies, development banks, foreign aid programs, developed country funds, research foundations, among others, are examples of the increasing number of financial and expert sources to be used by the developing countries when planning for their developmental strategies. So often those agencies suffer from bureaucracy and red tape which hinder the progress of development from their supported programs.

Inspite of new trends advocated by the great majority of funding agencies in support of involving women in the process of designing and executing their programs, very little is being done in accordance with these trends. Perhaps the reason lies in the minds of the male decision makers, and the lack of technically trained women as compared to their male partners. This situation brings to the fore the urgent need to finance training programs for women in the multidisciplinary area of environment.

Training programs need not be specifically tailored for women; on the contrary, training management need only insist on the presence of females for execution of the programs. It has been proven successful in many societies - even the most conservative - that when the funding agency stipulates that women should be important partners in development, the served society begins to accept that women's participation can make a difference.

Women in sustainable development programs

There is a significant number of funded projects aiming at empowering women by involving them in developmental projects for income generation. Environmental education and awareness-raising measures can be introduced to the women taking part in those projects.

For example, through community participation and women's involvement in water and sanitation projects, health and hygiene habits can be introduced; the community begins to feel the impact of cleanliness on their families' and children's health. There are many similar examples of how women can learn about energy conservation and conservation of resources through non-destructive use and recycling. Doing so will clarify those areas where research is needed to minimize women's exposure to added impacts of environmental degradation on women's health.

If every funded program or research project would include a basic component about the environmental impacts of such developmental action, as well as the role of women in such an activity, women would find it easier to share with their male partners what is expected of them to do. In this way, duplication of expenditure on manpower development would be avoided and women would be accepted as counterparts in the process of sustainable development.

It should be always kept in mind that each society has its own traditions and idioms which are practiced and transferred from one generation to the next. Women are usually the conservers of those traditions. It will be a reason for failure if funding agencies, as they mostly do, were to rely totally on their countries' ex-patriots in the execution of the programs - neglecting the natives in general, and women in particular.

Funding NGOs is one of the areas which needs thorough consideration on the part of funding agencies. Although NGOS still need considerable guidance in their roles in support of conserving the environment, giving them technical and financial assistance will empower them to do much more than could be expected from them in a shorter time. NGOs usually do not suffer from the red tape which can hinder action in many governmental agencies.

The NGOs coming from within society make them much more accepted as a means of change than even the most well established organizations from outside the region.

Funding sources

Funding of projects in some developing countries can be granted through governmental bilateral agreements between the donor and developing countries.

Most of these projects are agreed by governmental planners who may not be even aware of the role that should be played by women, or who may not be convinced on this point.

Either way the conclusion is the same. Women's projects aiming at finding solutions so that time can be saved for more positive aspects of development, are left out of national plans.

In this category of sources are the following: American, Swedish, Canadian, German, English, Swiss, Norwegian and Japanese governments.
Development banks can also fit in this category, although banks insist on conducting Environmental Impact Assessment for their funded projects. They well realize the relationship between the success of a project and the environmental factors which, if not considered seriously, can lead to a less successful project with lower financial return on their investment.

Yet, all banks should stress more seriously the involvement of women in the execution of their projects.

United nations agencies and economic commissions:

The World Health Organization (WHO) and its regional offices;

The United Nations Development Program (UNDP) with its regional offices;

The United Nations Environmental Program (UNEP) with its regional offices;

UNICEF with its regional offices;

UNESCO with its regional offices;

The United Nations Center for Human Settlements (UNCHS);

United Nations Development Fund For Women (UNIFEM);

United Nations Sudano-Sahelian Office (UNSO);

Food And Agriculture Organization (FAO) with its regional offices;

The International Labour Organisation with its regional offices.

Research foundations:

There are several funding research foundations in the industrialized countries headed by USA, England, France, Germany and Japan.

Other Recognized Sources For Funding:

International Development Research Centre (Canada) (IDRC)

Equity Policy Center
4818 Drummond Ave,
Chevy Chase, MD 20815, USA

Women's International Cross-Cultural Exchange (ISIS/WICCE)
P.O. Box 2471
1211 Geneva 2
Switzerland

IUCN Working Group On Women, Environment
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The above short list comprises only some of the research centers around the world which are interested in supporting women's role in environment and development. There should be a more comprehensive list provided by UNEP and UNDP, since to my knowledge, this is available for their internal use.

The most important aspect with regard to different financing and funding agencies, are their annual strategies, on the basis of which their budgets are normally allocated.

It is very difficult for an outsider to understand the procedures and approaches to be followed in order to get the required funds, as many offices and titles are often abbreviated, and it is time-consuming and difficult for an individual or organization outside the UN system to channel a request.

Swamp Rehabilitation in Kiang Central District, Lower River Division, The Gambia - 1987 to Date

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Statement of problems addressed

a. Prevention of salt water intrusion into the swamp rice ecology

b. Conservation of fresh water for rice production

Number and brief description of people involved

a. The number of people affected comprise the total population of 1,200 whose livelihood depends on rice as their main staple food with, women as the traditional rice growers.

b. About 80 per cent of the population participated and 80 per cent of them were female.

Approach and methods used

The approach was participatory, and the methods were as follow:

a. The request was made by the villagers to the Soil and Water Management Unit (SWMU) of the Department of Agricultural Services who provided the technical know-how.

b. The men (20 per cent of the participants) used their spades to shovel the soil into the women's headpans provided by the SWMU.

c. The women poured the collected soil on the dikes and built them.

Women's participation in the design and execution of the project

Their participation was high and they comprised the greater percentage of the participants. In addition:

a. They are members of the management committee which is responsible for land allocation, and which determines the job pattern.

b. At the end of the construction work, women manage their production systems.

Obstacles and/or socio-cultural constraints

a. One of the major constraints is the land tenure system - i.e. land is owned by a family unit (Kabilo) which only allows the women to develop and use it. In case of conflict, ownership rights remain with the Kabilo. Plans are in progress for a detailed study on the land tenure system under the newly approved Agricultural and Natural Resources Management project funded by USAID.

b. The use of Food for Work as an incentive is not encouraged by this project. Thus, while other projects give food for work, this approach may jeopardize active participation.

Major developmental and environmental results

The project enabled women to regain productive land formerly abandoned due to salient water intrusion.

Impact of results on women

The social dimension was considerable.

a. The women feel happy about themselves knowing that through their own labor, they had made a positive change.

b. The project strengthened the community spirit of "TESITO" (self-help) and enhanced the relationship between the village and its neighboring village Tendaba.

The environmental impact

a. The construction of dikes or bunds in the lowlands prevent salt water intrusion and curtails run-off.

b. The dikes also maintain the natural habitant of certain species of wildlife, fauna and flora. e.g. the dikes at Berending in Lower Nuimi, held back the water to fill the "Sacred" Crocodile Pond. As a result, the crocodiles remained a tourist attraction during both rainy and dry seasons.

Important lesson learned

a. The project should reflect people's needs.

b. There should be full voluntary participation of the people involved.

c. There should be a multiplying effect

d. There should be a monitoring system to ensure continuation.

Women Resource and Sustainable Environment in the Central Himalaya of India

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Proper education at various levels, a long range data base and a holistic approach would bring us nearer to sustainable development involving better quality of life, improved economic status and no adverse effect on life support environment (Singh 1988). In the present day context, the role of women in safeguarding environmental problems has become very important. Emancipated, better educated women are all the more able to make vital contributions to resource management and conservation. So on this front too, there is a need for a radical reorientation of development policies in order to upgrade the status of women (Sadik 1989). A UNDP project achievement report (1989) states that women constitute one half of the population, perform two thirds of hours worked, are registered as only performing one third of these hours, receive 10 per cent of the world's income, have only one per cent of the world's income properly registered in their name. According to a UNFPA report (1989) among various policy responses at the local level encouraging the participation of women in all development activities and promoting integrated community development studies and projects to include environmental conservation, natural and child health care, family planning and women's issues are also included. Tolba (1991) emphasized the need of encouraging women to explore new ways to protect their families and communities from adverse effects of environmental deterioration, while addressing the Asia-Pacific Regional Assembly held at Bangkok 11-15 March 1991. His objective was to enhance the participation of women of the region in environmental management and sustainable development and to strengthen among women a framework for further exchanges and education.

Meanwhile, the Rio Declaration on Environment and Development (1992) states that women have a vital role in environmental management and development. Their full participation is, therefore, essential to achieve sustainable development.

Thus at national and international levels, the role of women in achieving sustainable development is very important. In the Indian context particularly, the role of women in their rural milieu is more important as >80 per cent of the population dominated by women is rural.

Study area

The study was conducted and reviewed in a part of the Central Himalayan region of India lying between 28 43' 55" to 30 30' 12" N latitudes and 78 44' 30" to 80 45" E longitudes, and characterized by steep slopes and deep valleys, having a range in elevation from nearly 1000 m to over 3500 m. A study of Singh et al. (1984) using landsat imagery, indicated that only 28.7 per cent of the region is now forested and that only 4.4 per cent of the area has a forest with greater than 60 per cent crown cover (Table 1). The forest having 30 per cent, 30-60 per cent and >60 per cent crown cover represent poor, medium and good forest categories respectively. In this region nearly 83 per cent of the population is rural, living in 7000 villages including inhabited forest localities of various sizes. The density of population excluding the forest area varies from 14 persons/km square in higher hills (lesser or lower Himalaya) to 442 persons/km square in plain areas (outer Himalaya) (Pande, 1989). The submontane zone river valleys particularly with terraces and transverse spurs offer favourable sites for rural settlements. On the mountainous slopes, the settlements are located on debris deposits of ancient landslides. The agricultural fields extend from the valley-bottom to the ridge top and the settlements are located conveniently midway on the slopes. However, the wide valley bottoms have a much larger number of settlements. The sex ratio is abnormally high due to male outmigration for employment opportunities. Moreover, the population density is lower (113) compared to that of Uttar Pradesh (376). The density of the population depends upon natural factors such as climate, topography, and fertility of soil, and on the level of development initiated by agricultural productivity, industrialization and availability of other facilities. Thus, there are several problems being addressed for living in mountains, as below.

Problem addressed

Water, fuelwood and fodder

The Central Himalayan women suffer a great deal from fetching water, fodder, foliage and fuelwood, among other things. The distance they have to track bare foot is extremely tiring and long (Singh et al., 1984) because of rugged topography, insufficient accessibility to nearby places and increases in human and livestock population. It may be noted that 74 per cent of rural households fetch their daily supplies of fuelwood and fodder from very long distances, ranging from 1 to 8 kms. As much as 15.5 per cent of households have to go 8 to 10 kms one way to fetch fuelwood and fodder and about 8 per cent have to go still further every day (Table 2). This fact illustrates the difficult life of women in this mountainous terrain (Pande, 1987). It is estimated that for cultivating one ha. of land women have to travel through about 18 ha. area of forest land in search of these commodities at the present level of destruction. The deteriorating ecological conditions are said to be the root cause of the depletion of underground water reserves, drying up of springs and dearth of fodder and fuel. (Singh et al. 1984, Melkania and Melkania, 1991.)

On-the-farm, off-farm and domestic activities and responsibilities

The women of this region are overburdened with on-the-farm, off-farm and domestic activities. These activities comprise cultivation, levelling, sowing, hoeing, weeding, harvesting, threshing, winnowing, drying and storage of grains and their by-products. The off-farm activities include work relating to rearing of animals and fetching fodder and fuelwood from forests. The domestic work is related to the upkeep of the household. Besides the work, the women of the area are compelled to contend with worries, and frustrations borne out of their deep sense of helplessness against an extremely harsh nature and rigours of weather, and anxiety for their emigrant bread-winners. There are, moreover, ailing old people, the undernourished and neglected children, against a back-drop of natural hazards and living in isolated and secluded places where timely medical facilities are unavailable. The total working days of rural women in a year range from 330.45 - 357.43 days for 0.25 ha. or less land to 2.0 ha. land holding. It includes 128.86 days in farm, 49.09 days in off-farm and 154 days in domestic and other activities (Pande, 1988) (Table 3). In this area, because of a large number of cattle, the land to cattle ratio is about 1 : 0.7 (Anon, 1980). This adds to the work load of the women. Thus cultivation on steep slopes and overexploitation of land highlights environmental problems such as soil erosion or soil loss. Soil fertility is also adversely affected because dung is used as dung cakes for fuel, instead of manure. They are forced to do this because of scarcity of fuelwood, and even low quality fuelwood (of low calorific value) such as crop residues, bushes, etc., are not available in sufficient quantities. The low priority given to girl's education is very much related to their work-load in on-the-farm, off-farm and domestic activities.

Faulty land use practices and lack of irrigation facilities

In an effort by Jalal (1975-76) (cited in Pande, 1988) taking into consideration factors such as relief, degree and aspect of slope, soil texture, depth, moisture-holding capacity and chemical properties, influence of settlement or accessibility to management, irrigation facilities, mode of cultivation, etc., the following land capability classes are noted: good quality lowland - 32.5 per cent; medium quality upland - 7.7 per cent; poor quality hill land - 6.5 per cent and forest land - 53.4 per cent. Of the total land, only 23.3 per cent is irrigated mediocre quality lowland, medium quality upland consisting of superior and inferior upland and poor quality hill land consisting of unterraced hill land. Shifting cultivation land and pasture land are unirrigated and drought and erosion-prone. In medium quality uplands, two crops can be grown in a year but poor quality hill and unterraced hill land and shifting cultivation land produce one crop a year and the land is suitable for growing fuel, fodder and timber species. Pastures suffer from severe erosion. However, they are capable of growing fodder grasses or trees. The forest land includes reserve forest, civil forest and panchayat forest. Thus poor land, lack of irrigation facilities and lack of appropriate technology makes the agriculture non-viable (Singh et al., 1984), with a drain on women's labour and environmental deterioration.

Number and brief description of people affected

The total number of women and children affected in this region is approximately > 80 per cent because of lack of employment opportunities in this area, and the outmigration of youngsters from families. Women are forced to gather natural resources for livelihood and have no time to devote to children's education. Old people living in the houses are unable to take responsibility for household work.

Approach and methods used

Questionnaires were developed to survey different processes, systems, resource-use and utilization patterns. A 33 per cent sampling of the rural area was done in a considerable number of villages in the Central Himalayan region. For assessing fodder and fuelwood use, harvest methods (using quadrate of 1 x 1 m) was followed and harvested material was oven dried and weighed. Several studies and ecodevelopment projects operating in these areas were also reviewed.

How did women participate in the design and execution of programme/project?

In some of the ecodevelopment projects the participation of women takes place through Mahila Mangal Dals (Shah, 1992) and other women's organizations. Through these organizations, awareness of environmental problems and women's rights is being developed. Efforts are also being made to increase literacy among children.

Obstacles and/or socio-cultural constraints

Obstacles are increasing population, increasing sex ratio due to outmigration of male members from families, lack of a healthy mentality towards girl's education, lack of free environment and lack of provision for reducing work-load for girls, to enable them to have sufficient time for education. Other obstacle include conservative thinking, lack of awareness towards environmental deterioration, lack of employment opportunities and poverty.

What were the major developmental and environmental results?

There are some rural women's organizations. However some are not very influential. The pressure on adjacent forest ares for fodder and fuel collection and over grazing is still increasing. Afforestation programmes in soyam, private and community lands are being undertaken by governmental and non-governmental organizations. However, success is not up to the mark in most cases.

- the AFC report (1991) (Table 4) on afforestation programmes states that without active participation of local people, efforts will ultimately be wasted.

- the development of the horticultural belt in some areas shows promising results (Bisht, 1992).

- indigenous fodder species are giving good output.

- the problem of irrigation and drinking water is yet to be solved for most areas.

What impact or linkage do these results have on women?

Almost all the work is being performed by women. Good implementation of organizational and eco-development programmes which ease the burdens of women in farm and off farm activities, and allow them time to devote to herself and her children, and towards education and participation in developmental programmes including environmental awareness and conservation seems quite helpful in the context of environmentally sound and sustainable development in Central Himalayan region of India.

Important lesson learned

By neglecting the existence of women, sustainable and environmentally sound development of the region is not at all possible.

Recommendations

- There should be full involvement of women on a priority basis in all developmental and environmental programmes.

- Cooperation of the family should be strengthened in making women mentally free from all social and cultural constraints against her participation in developmental and environmental programmes.

- Provision should be made for educating children towards environmental awareness.

- Afforestation programmes should also be based on experiences of women.

- Provision of sufficient supply of fuel and fodder should be from outside sources, and employment generation should be expanded within villages by developing: (a) resource-based industries, compatible with environmental security; (b) pollution-free industries; (c) small-scale industries based on alternative sources of energy such as wind mills, solar energy plants, etc.; (d) demand-based industries; (e) promotion of entrepreneurship and technical know-how; (f) development of the quality of the population (Vaid, 1987). Education, therefore, has a effective role to play in environmentally sustainable development and should provide a high order of common purpose and understanding between scientists and politicians (Vaid, 1988).

Table 1. Forest cover in Kumaun,interpreted from Satellite imageries (J.S. Singh et al., 1984).

Category	Area (km2)	Percent of total area
Poor forest	1767	8.4
Medium forest	4381	20.9
Good forest	1017	4.8
Total Forest	7165	34.1

Table 2. Distances women have to trek to fetch fodder and fuelwood

Distance of sources of fuelwood and fodder (one way) km.	No.or Households	Percentage
Within 1 km	12	2.67
1 to 3	151	33.56
3 to 8	180	36.99
8 to 10	70	15.56
More than 10	37	8.22

Source: Pande, G.C. 1986.

Table 3. Working days of rural women in farm, off-farm and domestic and other activities.

Size of land holding year	Farm	Off-farm	Domestic & other activities	Total working days in a
0.25 or less	79.76	55.69	195	330.45
0.25-0.5	108.77	49.53	177	335.29
0.50-1.0	156.19	47.01	139	342.20
1.0-2.0	187.09	42.56	126	355.65
> 2.0	212.70	39.73	105	357.43
Total	128.86	49.09	154	344.21

Source: Nirmala Khetwal, 1980. p. 483 (cited in Pande, 1988).

Table 4. Survival rate of social forestry,plantations in U.P. during 1987-88 and 1988-89.

Year	Survival rate (%)
1979-80	39 to 54
1980-81	39 to 54
1981-82	30 to 62
1982-83	39 to 68
1983-84	20 to 53
1984-85	50 to 65
1985-86	40 to 50
1986-87	52 to 77
1987-88	40 to 77

Without the active participation of local people, the effort will ultimately be wasted. (After AFC report 1991, Status of Social Forestry in Uttar Pradesh, Core Group report.)

Table 5. Number of Forest Panchayats in U.P Hills of India.

District	No.of forest Panchayats
Almora	1,719
Pithoragarh	983
Nainital	198
Chamoli	496
Pauri-Garhwal	662
Total	4,058

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Technology with a Woman's Face: Facilitating Interaction between the User, Inventor and Promoter in Energy Programmes

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Rural energy surveys conducted by the Gujarat Energy Development Agency (GEDA), the State nodal agency for the promotion and popularization of Renewable Energy Sources and Energy Conservation, confirm that in the domestic sector, household cooking is the largest consumer of rural energy, consuming as much as 78-95 percent. Wood/twigs, agricultural residues and dung, which are usually gathered free, supply almost 98 percent of this energy. On an average three to five hours are spent per day, and as much as six to nine hours in certain arid regions in the State, per family to collect fuelwood.

The acute shortage of fuelwood in Gujarat can be gauged when one realizes that against an annual requirement of about 4 million tonnes of fuelwood, apart from agricultural residues, the availability from the states depleting forests is hardly 1.2 million tonnes. As a result, one million tonnes of precious cow dung which should go to the field as manure is being annually burnt for cooking and water heating. Those who have no land are facing increasing hardships. It is obvious that in rural areas of most Third World countries it is women, and not men who have generally been left to cope with the physical and financial stress caused by problems of shortage of energy. It may be noted that while policies and schemes recognize cooking energy as a pressing problem, and observe the strain it causes to women and young girls, and stress that highest priority be given to the rural domestic sector, the central role that women can play in the successful planning and implementation of fuelwood innovations is not given due recognition.

In the State of Gujarat, GEDA has been responsible for the promotion of over 300,000 improved cookstoves, constructed 20 community biogas plants, promoted 25,000 solar cookers, undertaken energy plantation on 3600 hectares of wasteland, and coordinated the implementation of the integrated Energy Planning Programme in 15 blocks. In addition, efforts to ease the cooking energy problems are undertaken by other state agencies such as the Gujarat Argo Industries Corporation (family size biogas plants) Forest Department (social forestry and farm forestry programmes) Panchayat Raj and District Rural Development Authority (improved cookstoves). The State of Gujarat was awarded the national shield for the best overall performance in the promotion of Renewable Sources of Energy for the year 1988-89, 1989-90, as also the best performance in the promotion of biogas for the years 1988-89, 1989-90 and 1990-91. It was the first state in the country to introduce the solar cooker to the general public and has made efforts to promote solar cookers in urban and rural homes.

To briefly highlight project of the Gujarat Energy Development Agency, and other programmes in Gujarat: the Motipura Biogas Co-operative in Mehsana district in Gujarat initiated by GEDA, has been successfully managed by women for more than 4 years. The involvement of women after the plant ran into trouble ensured that there was no shortage of dung for the plant as it is the women who tend the cattle, are responsible for the collection of dung, and will also benefit from the supply of biogas.

The solar cooker programme in Gujarat has encouraging experiences of women who have motivated several other women to adopt solar cookers, of women who have experimented with a variety of solar-cooked recipes in a systematic manner and demonstrated the versatility of the solar cooker. R & D has been responsive to women's needs, and the initial design of the solar cooker has been modified to weigh only half as much, in order to facilitate carrying the solar cooker between the kitchen and outdoors. A newsletter keeps in touch with solar cooker users and offers guidance about the use of the solar cooker according to the season, simple home maintenance, seasonal and innovative solar cuisine, exchange of experiences with other users, and answer to their queries on various aspect of solar cooking. This has helped users to dispel doubts about solar cooking in winter, discoloration of vegetables because of solar cooking adaptation of solar cooking to traditional recipes, and so on. It is interesting to note that women users of solar cookers express great satisfaction with the solar cookers and say that it not only saves energy but saves cooking time too as food cooked in a solar cooker does not need constant monitoring.

An experiment to adapt tribal folklore into scientific folktales through the creation of a 15-module energy and environment education package in a series of interactions with the community - women and children and teachers - has been successful in helping children and women gain a clearer understanding of role of trees in sustaining natural cycles, and has been successful in breaking their resistance to science and technology education and bridging dialect and socio-cultural barriers that inhibit learning.

On the other hand, success in the promotion of improved cookstoves and social forestry programmes has been elusive. According to a recent report, the Gram Panchayat of Indral village in Vadodara district, Gujarat resolved that its gochar land (community pasture land) be planted with 10,000 saplings. The forest department personnel arrived in the village and started operations. The villagers (about 200 people, which included 60 women) started satyagraha (protest) against the project. The plantation area was trampled under the feet of several hundreds of cattle and destroyed beyond redemption. The villagers alleged that they were not taken into confidence when this move was planned. They felt deprived of their grazing area.

Gujarat was unable to meet its target of 100,000 improved cookstoves for the year 1991-92, and about 60,000 improved cookstove were constructed during the year. Monitoring of the improved cookstoves programme implemented by GEDA through a network of 85 grassroots voluntary agencies has revealed that about 48 percent improved cookstoves are in good condition and regularly used, 23 percent are in use, but need some repair and maintenance, 16.3 percent are in poor condition and 12.7 percent have been demolished because of technical and cultural constraints. A detailed study of the results reveals that success hinges on the extension efforts of the voluntary agency implementing the programme in the field, i.e. the extent to which they have been able to take the women into confidence, understand their needs and give them the necessary support and understanding of the technical aspects underlying the innovation.

An analysis of the enabling and disabling factors in the successful integration of fuelwood innovations and new cooking energy technologies into the socio-economic, technical and cultural fabric of the community, points to the central role that women play in the successful management of change, the need to organize their participation and draw on their indigenous knowledge and skills, and to tap their leadership potential and enhance their technical capabilities.

Facilitating a flow of information - an interactive relationship between the Inventors (research), Promoters (policy planners, manufacturers and change agents etc.) and Users (women) is crucial to the successful diffusion of new technologies. Technology users and more so women often do not obtain sufficient knowledge of the operating principles and potential of the development package from extension agents (who may not be adequately informed, especially in energy issues, as energy programmes do not have established extension networks as is the case with health and agricultural and water development), in order to incorporate them into the conditions and constraints of their existing cooking energy system. Likewise the researchers often do not receive sufficient information about the needs of users and the operating experiences of the products of their research, in order to carry out necessary re-design of hardware and re-thinking of research. Promoters have not the necessary insight regarding the social, economic and cultural context that the technology has to adapt to, in order to accordingly design/modify energy programmes. A continuous feed-back and feed-forward information flow would ensure that innovations are appropriate to users needs. This together with the users' increased sense of involvement and understanding of technical aspects underlying the innovation could bring about a ready acceptance and hence successful diffusion of the innovation.

However, while planning women's participation, one needs to consider that there are seventeen development programmes for rural women pursued by different government departments, each impressing its own priority and trying to compete with the other. According to a study of rural priorities, the basic needs associated with energy, namely - domestic fuel, electricity and street lighting ranked low in rural priorities. Only 3 per cent of women counted fuelwood in the 5 priorities. In Gujarat, women though in sympathy with electricity did not give much priority to fuelwood. In view of this, a piecemeal approach would defeat its own purpose, and therefore calls for an integrated methodology that cuts across programme lines and reflects the experiences and needs of women, and does not further stress their already taxing daily routine. The Integrated Energy Planning Programme initiated by the Planning Commission, Government of India, under the umbrella of the

Integrated Rural Development Programme is a right step in this direction to coordinate the efforts of various development agencies and link energy programmes to rural priorities.

Bugata/Makwasinyi Community Water and Sanitation Project

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Introduction

The Buguta/Makwasinyi Community Water and Sanitation Project is located in Makwasinyi sub-location, Kasigau location, in Voi Division of Taita-Taveta District. The sub-location has an area of approximately 88 square kms. with a population estimated at about 12,000 people (ref. trial census - 1989)

The area is semi-arid with annual rainfall ranging between 480 mm-650 mm. The soils and vegetation cover most of the area, scattered with short shrubs and thorny trees.

The project was founded with eight women groups in the location of Kasigau in Voi Division - Kenya.

Health socio-economic infrastructure

The current population of Buguta-Makwasinyi is estimated at 12,000 people with high population densities around Buguta, Kisimenyi, Kulikila and Kasigau Hills.

The Taita Kamba and Duruma ethnic groups are the main populations. Most of the people are low income families relying on subsistence and livestock farming as a major source of income.

There is only one health facility - Rukanga Health Centre situated about 20 km from project area. People have to walk this distance to get treatment from even easily curable ailments such as fever, headache, wounds resulting from scratches of tree shrubs etc. There is now a mobile clinic operating at Makwasinyi and Makumbusho once a month: a project for Kenya Water for Health Organization.

Problems addressed

The project has poor ground water potential and the only source of water available is located at the top of Kasigau Hills in small perennial springs which travel a short distance downstream before fading away. An average resident had to travel a distance of between 6 to 20 km a day to fetch water from the springs. Livestock also had to trek similar distances.

The Buguta/Makwasinyi Community in summary were faced with the following problems:

- Lack of adequate and safe water within manageable distances; Poor health conditions resulting from unsafe water and lack of health services within reasonable distances, a high mortality rate and serious malnutrition cases for pregnant mothers and children, disappearance of indigenous species and traditional drought trees and vegetation cover;

- Environmental degradation;

- Low community income.

Methodology used in addressing the problems using the eight women groups

- The community held meetings and prioritized their needs in the order listed above.

- They were assisted to analyse the resources they held and identified what they did not have.

- 1984 the community requested KWAHO for assistance in achieving their needs they could not meet.

- Through KWAHO and collaborating Government Ministries held a series of meetings in order to identify, plan and work into possible ways of implementation of the project.

- It was agreed that all stages of project development would involve the three parties would assist the community to be fully involved at all stages if sustainability was to be realized.

- It was also resolved that environmental hygiene and gender activities become an integral part of the project.

- WATER: Establishment of gravity fed water supply system 35 km pipe network installations of 8 community water points (CWPS).

- Establishment of a water management committee and training of commitees in operation and maintenance, as well as management of water facilities.

- Regulations and conditions which would govern the water associations were formed.

Health education and sanitation

- Extension services provided by 3 "Water for Health Assistants" (WAHAS) conducting a hygiene campaign through home visits, public "barazas" and other, for a women's group meeting;

- Production of culture specific health education manual - Maji Na Afya Bora Kwa Jamii) for the community;

- Provision of demonstration sanitary facilities at CWPS and schools;

- Provision of a mobile outreach clinic in conjunction with the Ministry of Health.

- Activities on the importance of drought - resistant food crops were embarked on to sustain nutrition.

Environmental degradation

- Provision of livestock watering points at appropriate areas;

- Training and education on livestock management;

- Education and creation of awareness on environmental protection and conservation;

- Promotion of agro-forestry activities with emphasis on indigenous tree species;

- Seed beds for schools, women groups and homes have been introduced.

Low community income

- Mobilization of resources through membership fees, shared capital, local expense and Harambee fund-raising drives;

- Monthly subscription fee for every member;

- Stabilized soil block and tile making project, using locally available materials;

- Promotion and support of new and existing small-scale business enterprises through women groups;

- Women make handcrafts, are putting up a bakery, cereals shop and keep livestock.

Women's role

The project area has a gender parity of 58 per cent (42-58) Right from the period of project inception, planning and implementation, women played a bigger role in terms of participation, involvement and ownership. This is justified by the fact that it is the women's job in Kenyan society to fetch water, tend to children, cook, keep the environment clean and undertake other domestic chores.

Any effort therefore to relieve the women such burdens would be most welcomed by the women themselves. The Buguta/Makwasinyi Community water project has had quite a high degree of gender involvement owing to their organized women's groups. There exist women groups registered with the Ministry of Culture and Society Services. These groups are affiliated to the project and the main contribution towards the success of the project. The groups carry out different activities which have now become a corner stone for the community water project.

As the saying goes "Once you educate a woman you have educated the whole family". KWAHO targeted mainly women groups for health education campaign based on primary health care concept.

People in this area mainly fall in the low-income bracket. There is need to assist women's groups in income-generating activities (IGA's) in relation to the time saved by women from fetching water. This would, in turn, guarantee the sustainability of the project through cash commitments by its members and also improve the living standards of the community.

The "Maji Safi" (Clean Water) Women's group has benefited from a KShs. 12,000 grant from KWAHO to be used as a revolving fund among its members. Their main objective is to preserve the rain water as additional option and improvement of their sanitation.

Socio-cultural constraints

As in any development project, there are constraints in trying to achieve its goal. The Buguta/Makwasinyi Community is not homogeneous, as such, and making it a cohesive society took a lot of time.

After the infrastructural development was complete, some members were not readily contributing towards the sustainability of the project through monthly subscription fees. This was mainly among the Duruma ethnic group whose tradition allows for polygamy, as well as married sons staying within their homesteads. Such homesteads were paying one monthly subscription fee, yet there were more than one family. This is being rectified through a massive campaign by village elders, women's groups and chief's "barazas".

There was also the problem of the cutting of water pipes by the livestock owners to water their animals to their convenience. A similar campaign is also being carried out to change peoples attitudes.

- VIP sanitation and waste disposal. KWAHO has allowed the communities to develop and improve their own toilets and they have dug holes to dispose of their household waste.

Development and success

The project achieved the infrastructural development of a gravity-fed water supply system of 35 km of main and distribution water pipelines, 4 ferrocement storage tanks (200 cubic meters in total), 8 water kiosks, each with a kiosk attendant employed by the community, construction of demonstration sanitary facilities around each wate kiosk (viz: VIP latrines, washing slabs, bathrooms,).

About 50 per cent of the population have clean adequate and safe water within manageable distances.

There are improved hygiene standards in families, following health education campaigns. There is also increased awareness of environmental conservation through agro-forestry activities as seen from the planting of fruit and indigenous trees around homesteads and shambas especially kitchen gardens around communal water points.

Time saved from travelling long distances for water is now being used by women in establishment of income-generating activities and to address the issues of health and sanitation.

Women will still need a great deal of support in order to achieve adequate water supply to their homes, improved nutrition and sanitation. Viable economic independence will need a total new approach. For this, KWAHO will need outside expertise.

Lessons learned and recommendations

- Careful study of the communities socio-cultural background before launching of any project.

- Involvement of the community right from prioritization of their needs to implementation stages is the sure way of having a sustainable community project.

- Infrastructural development should not outweigh the integral components such as training, health education as well as gender activities.

- A well planned phase-out period shall be defined from the onset of the project.

- There is a need to develop an everlasting link between the community and the implementing agency. In the Buguta/ Makwasinyi case, there exists a patron who was elected by the project beneficiaries. He is an overseer and chief advisor to all project activities.

- adequate phase-out plan has to begin from the inception of the project. if the community is to take over with minimal difficulty.

- If women initiate the project, they must also take over to ensure sustainability.

- In the final analysis, individual communication in the long run may be the answer.

- Donor, community and agency relationship is crucial, for sustainability.

Need for impact study

(a) Overview

KWAHO is in the process of making an impact study to physically and technically assess this project in order to come up with possible solutions, not only for further direction but also for the communities to learn from their own programme. In the case of the agency and the donor apart from lessons learned, will be self-analysis, among many other factors.

(b) Women

A participatory evaluation should be undertaken, to see what role women played whether they were just a conduit to funding, an entry point to the project, decision-makers or project passengers, or future policy makers in the villages.

(c) Could such an analysis influence donor/agency thinking in the future? How would the sustainability of such projects by the community be handled if a project is to succeed.

Conclusion

(i) This project being in a very arid area, must be seriously considered, because such projects are not easy to fund; nor are many agencies likely to work in wilderness areas. Hence it is importnat to find the communities who will go to any length to give their time and energy to work voluntarily on their projects.

(ii) I am also indebted to the Programme Officers, Mr. Hassan Adams, Water Engineer in charge of the project and Mr.Gerald Kisongoch, the Project Officer dealing with environment and rain harvesting project for the valuable information they provided for the production of this paper.

(iii) Finally, I wish to thank the sponsors of this Workshop (UNDESD) for inviting me to China to present this paper.

The New Wave of Environmental Movements Among Korean Housewives

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Statement of the problem

Korea has achieved a remarkable economic and industrial growth in the past 30 years since the Government launched the first "Five-year Plans for the Economic and Social Development" in 1961. As a result of rapid industrialization, Korean people have come to enjoy material affluence on the one hand. On the other hand, people have become more dependent upon materialism, while living passive and isolated lives. In achieving material affluence, we have lost our humanity. The socio-economic system, having been operated mainly in response to the needs of capital-intensive corporations and conglomerates, is drifting farther away from the needs of ordinary people.

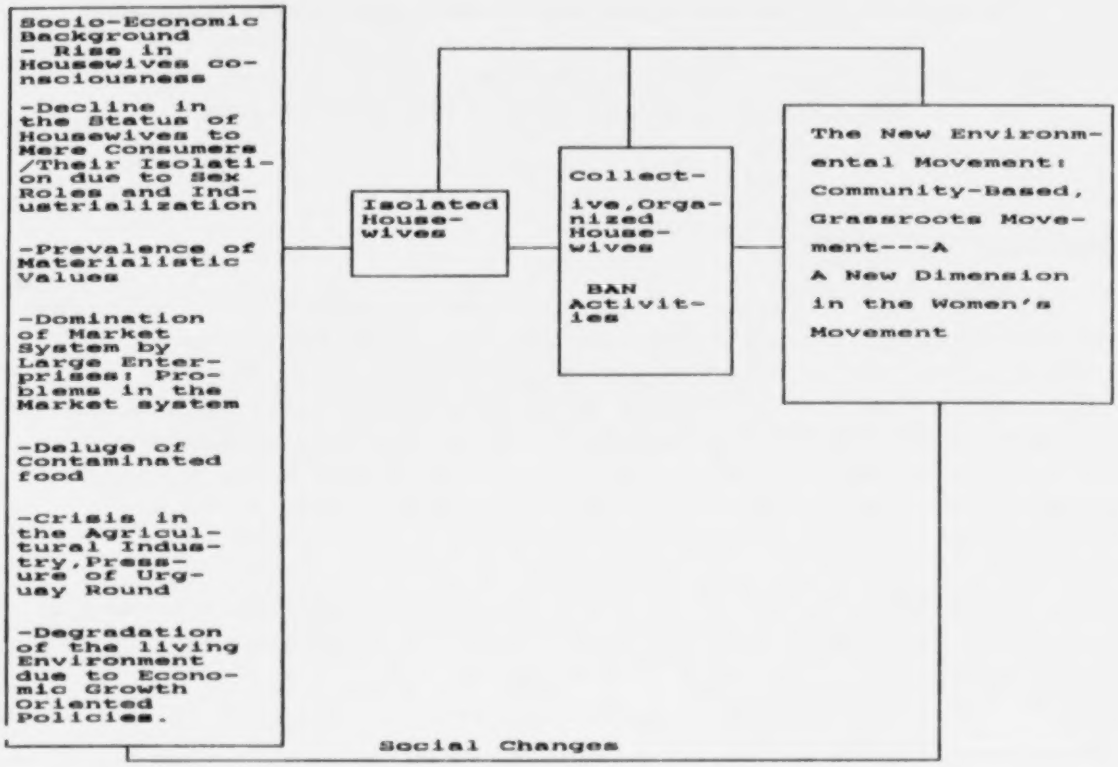
The environment, squeezed in the cycle of over-production and over-consumption, is deteriorating. For example, the number of automobiles in Korea has been increasing at full speed as shown below.

Year	Number of automobiles	% Increase
1965	41,511	
1975	193,927	467%
1985	1,113,430	574%
1981	4,247,816	375%

Korea is also experiencing a crisis in the agricultural industry. Korea used to be self-reliant in terms of meeting national needs for agricultural products. Until the 1960s, the nation produced more than 90 per cent of the agricultural products it needed. But now we only produce 30 per cent of what we need.

Until recently, not much attention has been paid to the environmental consequences that such a rapid industrialization and urbanization can bring about. A number of grass-roots organizations has been emerging since the mid-1980s in order to promote and execute the immediate environmental protection activities related to everyday life.

The diagram on the next page summarizes the background of this movement.


Socio-Economic Background
- Rise in Housewives consciousness
-Decline in the Status of Housewives to Mere Consumers /Their Isolation due to Sex Roles and Industrialization
-Prevalence of Materialistic Values
-Domination of Market System by Large Enterprises: Problems in the Market system
-Deluge of Contaminated food
-Crisis in the Agricultural Industry,Pressure of Urguay Round
-Degradation of the living Environment due to Economic Growth Oriented Policies.
Isolated Housewives
Collective,Organized Housewives
BAN Activities
The New Environmental Movement: Community-Based, Grassroots Movement---A
A New Dimension in the Women's Movement
Social Changes

The main purposes of this movement are summarized below.

1.to protect and preserve the ecosystem by simplifying consumption, by supporting organic farming, and by carrying out environmentally responsible behavior.

2. to overcome materialism and individualism and to restore a sense of solidarity between consumers and farmers as well as among neighbors

3. for women, mainly housewives, to take an active role in resolving social problems related to the environment, market economy, etc.

In this movement, housewives get together regularly (once weekly) in the form of BAN meetings to order organic goods and to learn about various social issues. Activities such as making soaps out of used frying oil, visits to the farm, recycling, campaigning are common.

The Number of organizations and members

Since the mid-1980s, more than 40 such organizations have been established. The largest organization has more than 7,000 members in Seoul and its neighboring areas.

The number of organizations and members are still rapidly increasing with the expansion of this movement at the grass-root level.

How did women participate in the movement?

The first such organization was initially organized and guided by a group of male social activists, involving an increasing number of housewives year by year. The Korea Women's Association for Democracy and Sisterhood, one of the powerful women's NGOs in Korea, first became involved in this movement in late 1988.

Until recently, housewives in Korea had not been sufficiently inspired with an awareness of environmental problems, and they lacked a sense of efficiency in being able to contribute to solving such problems. This was due to a lack of opportunity to participate in economic as well as social activities, and because of inflexible gender roles which limited them to household labor. But the state of 1) environmental degradation (due to industrial wastewater, toxic chemicals, air pollution, and urban waste land-fill), 2) food contamination (due to the excessive use of preservatives and pesticides), and 3) the crisis in the domestic agricultural industry, awakened them because these issues had a direct impact on their daily lives.

The movement is also an attempt to counteract consolidation trends within the food marketing system and to restore the old values of cooperation and communal way of living.

Obstacles and Constraints

Poor management and shortage of financial resources can endanger the growth of this movement, which has been led by the ordinary housewives. Another difficulty arises in the time contribution of housewives who are members of this movement, and who are preoccupied with the education of their children.

Major results

According to our research, women's participation in this movement changed their attitudes as well as their behavior related to various socio-economic issues including environment, politics, etc. They bacame more concerned about farmers. Their concern for ecological issues increased. They came to realize the importance of mobilizing women's power in bringing about positive changes in society. Participants engaged themselves in ecologically responsible practices in their everyday lives, such as curtailing the usage of disposable items, chemical detergents, and aerosol sprays, recycling renewable resources; boycotting products of industries which violate environmental ethics, etc.

Farmers are one of the groups who received direct benefits from this movement. Two major operating principles have been: 1) establishing direct marketing routes between farmers and consumers; and 2) setting up prices for organic products higher than for conventional products using chemical fertilizers and pesticides. The movement also pressured the Government to establish policies to support the research and development of tehniques for organic farming.

Lessons and recommendations

This movement is a community-based, grass-roots, and spontaneous movement, initiated by housewives. Thus, it has introduced a new dimension to women's movements in Korea which has been criticized in the past for being campaign-oriented and elite-centered. The leaders of this movement are realizing that in order for the movement to be successful, the two wheels of the movement - ideology and management - should be balanced. In order to strengthen the ideology, more effort is needed to develop new activities with their social impacts delineated. In terms of management, more leaders who are informed of the ideological aspects of the social movement and at the same time have the knowledge and skills in organizational management are needed.

A Micro-industry for Food Production from Solio Waste
(Tres Marias, Morelos, Mexico)

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Tres Marias is a village of 4,500 people located midway between Mexico City and Cuernavaca. More than 600 women provide food and eating facilities to travellers going to Cuernavaca every weekend. In 1985 the Health Ministry had registered more than 109,000 cases of gastroenteritis among its population (meaning that each person was ill once ever 2 weeks). Tres Marias is located at 3,300 Meters over sea level; rain water falls through in order to feed water supplies to Cuernavaca and other towns. Therefore contamination due to lack of sewage and potable water was a very serious problem in the village; only 1.5 per cent of the population had septic tanks; the rest of the people had badly built latrines. Water was very scarce.

In 1986, the Government of the State of Morelos built a water supply from a source located 17 kilometres away, and hired the professional services of the Alternative Techonolgy Group (ATG) in order to design, build and transfer the SIRDO Technology to the community.

The main problem addressed was public health, which was at risk due to the conditions mentioned above. On the other hand, Tres Marias used to be an agricultural producer, but land had been degraded because of the use of chemical fertilizers; the only crop was for animal food. This means that women proparing meals for tourists in small restaurants had to travel 70 km. away in order to buy tomatoes, onions, etc. Thus the SIRDO was adequate because it enabled the production of biofertilizer, using solid waste and human excreta; the BF produced has proven to be of excellent quality, improving land production. Finally, there was no waste treatment system.

The men are mainly employed in animal food production (4 months/year). The women are dedicated to preparing meals for tourists. Apart from these groups affected, we had to consider people affected indirectly due to the contamination of the water supply in towns located at a lower level than Tres Marias. Basically, people required all sanitary services: sewage, waste treatment, and water supply.

The methodology developed by the ATG in Tres Marias came after six years working together with the people of the community; this work is divided into three stages:

(a) Stage 1: a project was done in order to provide recycling services for liquid and solid waste to all 620 houses and tourists. Five SIRDO units were built by the ATG with

State Government resources (1986-87). Information was provided to all blocks of the villege, with explanations through films of the advantages the SIRDO technology could bring to them, and teaching people how to separate organic and inorganic waste so they all could be recycled.

(b) Stage 2: In September 1987, the ATG started operating four SIRDO units, using this operation as a practical training activity for a Brigade formed with six young men from the village. Social workers of ATG intensified their activity, teaching people how to separate their waste. The population began to react to a system of incentives designed by the ATG. Unfortunately in 1988, there was a change in the government and work had to cease.

c) Stage 3: In 1989, the ATG managed to obtain the support of the International Development Research Center (IDRC, Canada) in order to continue working in the village with an appropriate applied research programme, aimed at establishing the basis for the sustainable development of productive activities. This Stage lasted till 1992. ATG managed to get the local government concession so the operation could be undertaken by the researchers and community people involved. The following approach was followed:

c.1) to undertake, as a first action, an impact assessment of the previous stages.

c.2) to establish a hypothetical "Typology of Users" according to their attitude toward waste and the environment.

c.3) to choose, at random, 35 per cent of each Type of Users who became the Test Population.

c.4) to measure the quantity and quality of waste produced by each type of user, applying a formula to establish who separated waste better, and in which quantities, and to determine which type of users gave more waste of a higher commercial value. These users we called "Collaborators". In the case of Tres Marias, women managing small restaurants were the best collaborators.

c.5) ATG was in the position to plan "directed social actions" focussing on two questions:

- what could it be the most efficient incentives for the group of collaborators, in order to ensure continuous action?

- what are their production needs and requirements?

c.6) In order to establish possiblilities of clarifying consumption and production, we had to process data collected from the test population, taking as a basis for analysis the characteristics of waste (quantity and quality) generated by each typology. We had to simulate several scenarios and apply a cost-benefit analysis for each simulation, always based on real, collected data.

c.7) The specific objective was to consolidate a "bridge situation" with collaborators in order to demonstrate the social and economic possibilites of recycling; reinforcing such type of users vis-a-vis the rest of the community. In this way we could consolidate a social base of users as a spearhead for consciousness and attitude transformation in the community.

The results were as follows: a micro-industry to collect separated waste and to transform such waste has been legally formed in Tres Marias. It is called SIRDOTEC and it has created 18 new jobs. Women provide plastic which is powdered to be transported to formal industry in Cuernavaca. Women provide organic waste which is transformed into biofertilizer to grow vegetables. ATG's research had proven that earth enriched with such BF could produce a sustainable horticultural micro-enterprise. So another activity was generated producing tomatoes, onions and other vegetables to provide the needed raw materials for women to prepare food/meals for tourists. In this way, women chose a cycle of production-consumption, generating what they needed to reinforce their economic activity.

These two micro-enterprises (SIRDOTEC and HORBI) are based on research undertaken, proving their sustainability (internal return rate of 17 per cent) and their social viability.

Women particupated all along in the process described above. But more than this, they are the social and economic basis for two micro-industries benefiting the whole village and reinforcing their local economy. This is clearly shown in the reduction of illness - from more than 109,000 cases/year, to 2,300 cases/year of gastroenteritis.

The main obstacles are political: in spite of the fact that the micro-industries are legally established, banks such as NAFINSA will not lend money to increase production to the levels women and the village need; though women have land to give as a guarantee for the credit requested, such land is communal and Banks do not accept it.

If women manage to obtain 250 million pesos (US$80,000) the local Brigade could collect more waste and produce the BF they would need to generate all the vegetables they need to reinforce their economic activity. According to the last scenario ATG developed, based on real data, the micro-enterprise HORBI could have a private benefit of 142 million pesos the first year; SIRDOTEC (recollection and transformation) could have a private benefit of 54 million pesos the first year. Nevertheless the major objective has already been achieved; public health is a reality now in Tres Marias. This has been achieved with the resources provided by the IDRC/ATG research activity. The possibilities for consolidating such a process are clear, but resources are needed to transform women into partners of the micro-industries are not yet available. Once the micro-industries mentioned can operate at the level needed, the social benefits (now evaluated with a similar internal return rate of 17 per cent) could be re-measured.

The main impact this project had in Tres Marias has been to strengthen the will which today unites women who worked and lived under difficult and limited conditions. Women and men united have occupied unused land around the village, in order to build houses very much needed by their families who had previously lived in crowded conditions. A new spirit has been achieved; people occupying such land now claim the right to produce their own vegetables, instead of travelling to Mexico City to buy them. They need more water and resources to recycle all waste generated in the village.

The main lesson we have learned from these six years' effort is that there are not in Mexico today, the financial structures capable of transferring environmental technology to women's organizations. No matter how serious the research is, and how deeply the people become involved, resources are needed to give continuity to the process which research has achieved. We consider that we have developed a methodology capable of being applied to other situations where sustainable development operating as the basis for an environmentally sound sanitation programme is to become a reality.

We learned that such a process grows in stages, building, creating and reinforcing "bridge situations" between the past and the future. Environmental education is an instrument by which to build such bridge situations; nevertheless, education does not involve more than the 30 per cent of the total population.

We recommend to others working in a similar environmental areas, to apply, in a creative manner, the methodology we have tried to systematize in Tres Marias. It is important always to focus an integral micro-regional process aimed at sustaining the economics of the group which responded to environmental education in the first instance, and transforming such a group into a spearhead of the process in the community. And finally, we ought to find channels for credits whose guarantees are accessible to women, in their local conditions.

It is important to make clear that the success achieved in Tres Marias - partial up to now - is mainly due to the fact that such micro-industries belong to the people who really became involved in the process, including the researchers and social workers. It is not addressed to the community as a whole, given that such a "community" as an homogeneous entity does not exist - at least, not in relationship with the environment. Such ecological consciousness needs to be created, step by step, on the basis of an economically viable project.

People working, like us, to make real environmental projects, economically viable and socially needed, need to put efforts into creating a financing structure capable of providing credits for micro-industries to ensure the continuity of successful, applied research projects.

Assistance to Rural Women Engaged in Salt Processing, Plateau State, Nigeria

United Nations Industrial Development Organization

State of problem addressed

Salt is an important source of income for women in Keana and Azara, located in Plateau State, Nigeria. Yet the methods used to produce it have been environmentally destructive and economically unsound.

At the national level it should also be noted that industrial large-scale salt production is very limited in Nigeria and large quantities of salt still need to be imported. Currently, Nigeria has to import 500,000 tonnes of salt a year for its 100 million inhabitants.

At the local level it can be noted that until recently the traditional salt producing technique required large amounts of wood as the brine needed to be boiled over a fire. Consequently, wood has become even more scarce, and has required women to walk long distances.

Number and brief description of people affected

The total population who work on the salt production in Keana is 1,000 women. In Azara there are about 400 women who work in this area. The salt production through solar evaporation techniques in the Plateau State (US/NIR/84/ 246 - Assistance to Rural Women engaged in Salt Procession, Plateau State) explicitly helps the women in this region.

Through this salt production process the women of Azara and Keana can become more independent because of the increase in earnings from this production. Furthermore, through this new technology women are able to help provide their families with a more balanced diet, help with educational costs for the children and help with other financial necessities. Moreover, this project reduces the workload of women by introducing new labour saving technologies.

In Keana, about 1,000 women work at the spring from the end of December to April (16-18 weeks). In Azara, about 400 women work at the spring in the same time frame as that of Keana.

Approach and methods used

Salt that was originally produced by carrying the brine to the plots is now pumped to the field directly with a simple diesel pump and hose, thus saving the women time and energy.

Cement ponds have been constructed in which the brine evaporates through solar radiation, while previously the brine was boiled for many hours until it evaporated using scarce fire wood which the women had to collect over long distances.

This new method a) alleviates drudgery; b) saves energy; c) contributes to preserving the environment; d) produces better quality and quantity of salt; e) increases income.

It has been estimated that one woman can produce 10 kg of salt every four days, or 20 kg per week. She sells one kg of salt for 5-6 Naira. Through simple arithmetic, one can conclude that during the the 16-18 weeks of production season, a total of 320 kg of salt can be produced by one woman. (16(18) weeks x 20 kg = 320 kg (360 kg)).

320kg x 5 Naira (6 N) = 1600 Naira (1920 N)
360 kd x 5 Naira (6N) = 1800 Naira (2160 N)

A seven-person household consumes an average of 35 kg of salt per year.

Every woman must give about 10 kg of salt per season to the Chief of Keana as salt tax, and a further 10 kg for maintenance costs for the plot. Thus out of a harvest of 360 kg, the woman has a good 260 kg to sell. Therefore one woman can meet the salt requirements of 37 families. The women of Keana cover the salt requirements of 37,000 - 42,000 families per year.

How do women participate in the design and execution of the programme/project?

One of the fundamental components of this project has been in having women participate from the very start through practical learning on how others have increased their salt production through this simple technology. Through the project it was possible for six women from Keana and Azara to travel to India where they obtained a first hand look at how this improved salt production technique was used. They saw how this environmentally friendly method helped to produce better salt with less effort. For example, a diesel engine pumps the brine directly to the salt field, which saves much time. More importantly, however, they saw that firewood was not required. Through solar evaporation alone the brine can be crystallized to pure salt without the use of wood.

Obstacles and/or socio-cultural constraints

As far as this specific project is concerned, there have not been any negative socio-cultural constraints. But one of the major socio-cultural constraints could have been the chief's unwillingness to implement the project. In this specific project, the chief of the village guarantees that salt production remains the right of women alone. This chief not only encouraged, but also supported the change towards a new technology.

One of the major concerns of UNIDO in the design of these projects is the use of technolgy that is energy-saving, environmentally sound, and adapted to the **socio-cultural conditions** of rural women. In places such as Plateau State, there is a long-standing tradition of salt production in villages, which is undertaken specifically by women alone. It is a part of UNIDO's strong mandate to integrate women in industrial development by developing technical assistance projects specifically targeting women.

What were the major developmental and environmental results?

Many of the major development results are mentioned in the above paragraphs. The environmental results can be found in the shift from using wood as the means to heating the brine, to using solar energy. It has been estimated that 10 kg of salt require 24 kg of wood. This wood must be fetched by the women who carry it over long distances. Using solar evaporation, however, requires absolutely no use of wood. The "environmental results" of such a change are immeasurably positive in terms of their short and long term effects on the area and its people.

What linkage and/or impact do these results have on women?

The results and impact on women have been numerous. One of the main positive socio-cultural aspects has been the economic power women have achieved. Not only does this help women become finicially more independent; it also enables them to feed their families and pay the costs of education. Another major positive impact is the new self esteem that can help women in other facets of life.

What recommendations can be made to others working in a similar environmental area as a result of this experience?

1) In order to bring in a new or improved technology that is intended to assist the target population, it is essential to convince the people of the advantage of this new method - ideally through a demonstration of its practical application in a real life situation. In this specific case, UNIDO made it possible for six women to visit already existing salt production sites using solar evaporation techniques.

2) It is important to promote a replicable technology for other regions where salt is produced by women. (UNIDO has similar projects in Niger, Gambia and Jamaica).

3) An important factor in any successful programme is the provision of appropriate practical training to the target group.

Women, Development and Environmental Protection
The National Environmental Action Plan of Sri Lanka

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Women and development has gained prime importance in Sri Lanka and so has environmental protection. However, issues related to both have been compartmentalized and are dealt with separately.

The Government has accepted WID as important. The Women's Bureau of Sri Lanka and the Ministry of Women's Affairs deal with policy issues related to WID. In the same way, environmental issues are dealt with by the Central Environmental Authority which comes under the Ministry of the Environment. A Sri Lankan case study suggests that there could be better coordination in the future so that projects are targeted towards women in environmentally sound and sustainable development.

Sri Lanka is endowed with a rich natural environment with adequate forest cover and lush vegetation. Its hydraulic civilization of the past stands out as a supreme example of engineering skill. However, with population growth and the opening up of more and more land for housing and cultivation, its natural richness has started to show signs of strain. Therefore the call made by the International Union for the Convention of Nature and Natural Resources (IUCN) and the resultant document "The World Conservation Strategy" was well received by the Government of Sri Lanka (GOSL). The Government appointed a Task Force for the preparation of a Nature Conservation Strategy for Sri Lanka. This Task Force included representatives of different governmental and non-governmental agencies. When its report was ready in 1988, namely the National Conservation Strategy (NSC), it was accepted by the Government as the declaration of national policy. Through a mechanism of steering committees and working groups, an Action Plan was drawn up with the assistance of the World Bank. These two documents were amalgamated into one National Environmental Action Plan 1992-1996, which will serve as a guide book for CEA in the future.

It is important to note that the NEAP lists under separate headings such as land, water resources, etc., different programmes for implementation. All such programmes could accommodate programmes particularly targeted to women. Even the non-governmental organizations could be incorporated into the Plan of Action.

It should be mentioned that Sri Lanka's participation in the Workshop has become timely and opportune. I have no doubt that there will a positive follow-up action on the part of Sri Lanka as well as donor agencies.

Improved Charcoal Cookstoves
(Kanun El Surour)

A Case Study of Sudan

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Sudan has been subjected to successive periods of drought during this century, resulting in crop failure and famine, and great loss of life of humans and livestock. The main cause of this disaster was found to be misuse by man of land, leading to desertification, which is the most urgent environmental problem in Sudan and Africa in general.

According to the Forestry Department of the Ministry of Agriculture, in 1981, 82 per cent of Sudan's total energy consumption was provided by fuel wood and charcoal, and 18 per cent was shared by imported fuel and hydroelectricity. About 77.8 per cent of energy derived from forestry products was consumed in households. Energy loss during the wood-charcoal transformation process in kilns is about 60-70 per cent. It is estimated that by the turn of the century, the forest resources of northern Sudan could be reduced from the present level of 37 million hectares to 17 million hectares.

Drought and famine in Sudan attracted the attention of the international community to save human lives. Many NGOs have come to Sudan to provide food aid; later their emphasis has shifted to rehabilitation of the degraded natural resources.

In 1983, CARE, as an NGO working for renewable natural resources conservation, started a project relating to an improved charcoal stove (Kanun El Surour), which is an exact copy of the Kenyan Ceramic Jiko.

CARE's orientation was to stimulate local potters and metal artisans to produce the new design, by providing technical training, start-up capital, tools and machinary, in addition to marketing assistance through extension work, mass media advertising and transport to distribute the stoves from manufacturers to retailers.

The traditional stove is made from a square tin with one large opening at one side and two smaller openings at the sides. The fire grate is made of thin iron strips, with two carrying handles at the top. (Fig. A).

The improved stove has based metal cladding which encases a shallow ceramic liner as the grate with a large opening at one side to pass air (Fig .B).

According to the Energy Research Council, the improved stove is characterised by durability, reducing emissions of toxic fumes by 20 per cent. Energy loss in the traditional stove is 70 per cent, while the improved stove saves 50 per cent of charcoal energy consumption; hence it promotes savings and increases the real disposable income of the household. In the rural areas it allows for more productive time to be spent by women for fuel wood collection.

The final goal of the project is to reduce fuel wood and charcoal consumption, and to establish production centres for fuel efficient stoves, as well as marketing networks.

The project was started in nine towns and surrounding rural areas in eastern, western and central Sudan.

In the pre-test phase, a number of stoves were distributed free of charge to women and the amount of charcoal used was monitored. Close contact was maintained with women for consultation as a result of which more improvements were made. The women were informed about the proper way to use the stoves and, through extension campaigns and mass media advertising, about the ecological and personal financial benefits of fuel efficient stove use.

According to CARE, many women have become fully aware of the benefits gained by using the Surour, but more effort is needed to convince aging women to shift from their familiar traditional stoves.

Although 30,000 stoves were produced and sold from January 1988 to June 1991, the supply is still below the growing demand.

The Project Program Officer has indicated that the project is currently faced with the difficulty of scarcity of scrap metal due to decreased importation of canned stuffs, so its price is becoming higher due to high production costs. Women are now aware of the economical and ecological benefits of the Surour, but they have pressing short-term needs. These obstades have slowed down progress in project activities. This area needs more investigation to ascertain whether artisans and potters are aware of the impact of the project on development, or whether they simply consider it as an income-generating interprise. One of the project's main problems is that emphasis was directed to production at the expense of marketing; thus for the next phase, the project plan is to stress the linkage between production and marketing.

At the socio-economic level, the project is to encourage empowerment of women and self confidence. The project staff assist local women in forming committees to provide extension work, register the number of stoves needed, and collect money. The project staff then help in transportation of the stoves that are distributed to local women through this committee. Furthermore, women have benefitted from the saving in time, resulting from less fuel wood consumption. Hence women's household activities have become less burdensome. But to what extent this goal has been achieved is still questionable.

The Ministry of Energy has established a committee to solve the problems confronting the project.

Although this project has achieved some success, the extent of its impact on the environment and on women's opinion about the project need more investigation.

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Farming in the Hills: Hilltribe Women and the Environment

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The forested hills of China, Vietnam, Laos, Myanmar and Thailand are home to many tribal groups. These hilltribe people have migrated slowly southward over the centuries from their ancestral homes in China whenever local wars or declining soil fertility have necessitated a move. Over the past 150 years hilltribe people have been moving into Thailand, especially during the last 20-30 years due to political unrest in Myanmar and Laos. Approximately 530,000 hilltribe people (about one per cent of the total Thai population - most from the Karen, Hmong, Lahu, Mien, Akha and Lisu tribes) now make their home in Thailand, living in small village communities dotted throughout the northern and western hills. Much of northern Thailand is hilly or mountainous with peaks reaching up to 2,600 metres; most villages are located above an elevation of 1,000 metres. As the primary social units are the family and the village, specific tribal areas are not defined; villages of several different tribes may be found on the same mountain.

Many of the tribal groups have traditionally practiced shifting cultivation. Upland rice is the main subsistence crop, maize the principal cash crop along with others such as soybeans, peanuts, tobacco, coffee, tea, fruit and vegetables. Opium - once a major cash crop for many of the tribes - is illegal in Thailand and now is rarely grown. People have traditionally supplemented their farming with hunting and gathering in the surrounding forests, and with small-scale trading for lowland goods such as iron and salt.

Thai government policy states that only hilltribe people who entered the country before 1976, or who were born here, are eligible for Thai citizenship. At present over 50 per cent of hilltribe people living in the country are not citizens. Lack of land rights is another serious problem as many of the tribal people live on land classified as forest reserves and watershed protection areas, as well as in national security zones along sensitive border areas, thus making their continued occupancy of the land subject to decisions made by the government on land rights versus resettlement. Lack of land rights is a problem that the hilltribe people share with millions of Thais, especially in Northeast Thailand, who are currently living in forest reserve areas.

Strict government policies on land use and increased pressure on land from population growth, tourism and commercial cash cropping/forestry interests now prevent the people from practicing shifting cultivation, requiring them to farm the same small areas of land on a continuous basis. While shifting cultivation was a largely sustainable system in the past when fields could be fallowed and left to regenerate for 15 to 20 years before re-use, the continuation of slash and burn practices on a restricted land base leads rapidly to severe problems of soil erosion and infertility. Rice yields have declined markedly; for example a farmer who used to harvest 1,500-2,250 kg of rice from one field ten years ago may now sow the same amount of seed and only reap 300-450 kg.

With the hills largely deforested from farming and logging, farmers face increased problems such as lack of water and the loss of a natural resource base that once provided them with food, fuel, fodder, medicines and construction materials. The cultural identity of the hilltribe people is also endangered as the "modern" world surges towards the villages with the rapid development of infrastructure such as roads and electricity, and through the effects of tourism and commercial cash-cropping of vegetables, fruits and flowers for lowland markets.

The Hill Area Development Foundation

The Hill Area Development Foundation (HADF) works in the mountainous region of Mae Salong, Mae Chan district, Chiangrai province, North Thailand - close to the Thai-Myanmar border in an area classified as a national security zone and the primary watershed of two rivers, the Mae Salong and Mae Chan. The majority of hilltribe people in this area do not have Thai citizenship or land rights.

At an elevation of 900-1,200 metres, 76 per cent of the land farmed is above a 50 per cent slope (7.4 per cent of this is between 80-90 per cent). According to the Royal Thai Forest Department, all land above an 85 per cent slope should be left as forest to protect the watershed; 50-85 per cent slopes are also designated as watershed protection areas and can be used only for forest or fruit and timber trees; slopes between 35-50 per cent can be used for large trees or pastures with soil and water conservation measures; and all land between a 21-35 per cent slope must use ecologically sound systems of farming (NB: 100 per cent slope = 45 per cent).

HADF was founded and began to work in Mae Salong in 1986, following requests from Akha, Lisu and Lahu hilltribe people for assistance with community development activities. Due to the distance from the nearest district town, and to the unsettled conditions caused by the drug trade and conflicts in Myanmar, no government agencies were then working with the hilltribe people of Mae Salong.

The coordinator of HADF - Tuenjai Deetes - had, since 1973, been working in cooperation with the Public Welfare and Non-Formal Education Departments as a volunteer teacher, concentrating on basic education and community development, in another part of Mae Chan - the Pangsa cluster of villages. The Mae Salong villages could see the increased confidence of the Pangsa villagers and the level of development attained - terraced wet paddy fields, a community forest and a forest reserve. As the growing population and environmental degradation in the Mae Chan/Mae Salong watersheds were causing flooding in the Pnagsa paddy fields, the Pangsa villagers were also interested in seeing support extended to their relatives upstream.

After surveying the area, HADF began working in 10 villages where the people felt able to fully plan and participate in community development activities. The number of villagers was eventually reduced to six for a variety of reasons (for example one village was burned and villagers from another fled as a result of the drug wars.)

HADF operates on the philosophy of respect for people's wisdom, culture and traditional knowledge, and with a commitment to full participation of the people. About half of the staff are hilltribes and about one-third are women. All learn to speak at least one hilltribe language. Initially staff are placed in the villages as teachers of both children and adults, and are encouraged to become part of the community - to be both a learner and a teacher. As well as teaching, staff act as facilitators of community development activities determined by the villagers - such as agricultural development, rice banks, cooperative stores, basic health care-through encouraging discussion, providing technical advice and inputs, and arranging study tours, training and meetings. Some staff members now focus on specific areas of expertise such as agriculture, human resources development and documentation.

Sustainable agriculture and other environmental issues such as forest conservation have become key areas of focus for HADF. The villagers want to settle permanently on the land and thus are eager to develop land use systems that will improve crop yields while at the same time conserving and improving natural resources such as soil, forest and water. Chiangrai provincial government officials have recently indicated their potential support for some form of communal land rights if the villagers can prove their ability to manage the fragile watershed environment in a sustainable manner; this agreement in principle has given added impetus to the work.

"What is between the house and the rice bin...": traditional relationship of the hilltribe people and their environment.

The Akha people have a saying - "A woman deals with what is between the house and the rice bin; A man deals with what is between other villagers and ours" (Grunfeld, p. 24) - which reflects the traditional polarities between men and women, and between forest and village, that are common to many of the hilltribe people. To the Akha, a woman's place is in the house, its immediate surroundings and the fields, though women do spend time in the forest gathering fuel, water, food and medicine (the average Akha woman knows at least 30 herbal medicines). The domain of man is the village, the forests, the trails and the outside world in general.

The forest - home of spirits and animals - must be kept separate from the village. In Akha custom this involves traditions such as the annual construction of ceremonial village gates that protect the village from animals, spirits, disease, theft and violent death, and taboos related to what is considered 'human' bithe (one well-formed child) and what is considered "animal" (multiple offspring). Despite its dangerous aspects the forest is valued as a vital resource. Akha oral history and law requires the careful preservation of a belt of forest up to 2 km thick around each village, separating the village from the fields. Other tribes also preserve the forest near their villages. The Lisu, for example, maintain the forest around the cemetery, and around the shrines to the spirits that protect the village and watch over the land.

The traditional animist/ancestor worship rituals of the people constantly reinforce their close ties to the natural world. To be an Akha one must have fields to farm, and the rice spirit is carefully honored and guarded. Each Akha village protects the springs and water sources, and maintains a sacred spring from which water is drawn for certain key rituals. Omens are watched for and respected. In the Akha world view, women are associated with rice and rain. In late August/early September Akha women and girls celebrate the Swinging Ceremony-swinging out over the valleys on ritual swings that are taboo for the rest of the year - to ensure continued rain and fertility for the crops. Woman have their own particular roles in ceremonies, and an older Akha woman who has borne at least one son can undergo an initiation that turns her into a White-Skirted Woman who then takes responsibility for her family's rice rituals.

At a time of low population density and large tracts of available land, shifting cultivation was a largely sustainable and environmentally sound method of tropical upland agriculture. While shifting cultivation does involve the cutting and burning of forest areas, the swidden patches were often cut from secondary growth rather than virgin forest and fire breaks were frequently prepared to control burning within the area to be planted. Large trees growing in the field might be coppiced rather than cut, and the forest was able to regenerate from the old growth surrounding the field. Traditional environmental conservation practices contributed to the long-term sustainability of the system, for example laying logs or bunds of weeds along the contours of the hill to prevent soil erosion, and digging diagonal ditches to carry off excess water. The ash from the burned vegetation contributed to soil fertility as did the use of rotting leaves and the practices of crop rotation (rice, corn, soybeans) and mixed cropping. Farmer practices varied among individual farmers and tribes, with some being more aware of environmental conservation practices than others.

Today, as in the past, both women and men farm the families' fields, with roles and responsibilities largely similar among the tribes. In Akha society, men are primarily responsible for the "heavy" tasks of clearing and burning the land, and women for digging, planting, weeding, processing, storing and seed selection. Both harvest and carry the crops. Men care for fruit trees and large animals, women for smaller animals such as pigs and chickens. Though land is viewed as the property of the men (women go to live with the husband's family), decisions about food crop production are made by the women; if the wife and husband can't agree on what fields or crops to plant, the Akha woman's decision is final. In Lahu society, where women also make the agricultural decisions, a disagreement between husband and wife may result in the field simply being left fallow for the year.

Introduction of sustainable agriculture systems

For the first year, HADF staff worked mainly at getting to know the villagers and at strengthening individuals and community organizations to interact with the outside world. In 1987 staff began, with the villagers, to survey other village needs; lack of rice and soil infertility/erosion were identified as major problems. The staff and village leaders decided that rice banks could help solve the rice shortage problem in the short term but that the long-term solution must lie in finding agricultural practices that, under current conditions of a restricted land base and growing population, are more sustainable than shifting cultivation. They decided to explore the potential of contour farming which involves the planting of trees and shrubs (often leguminous nitrogen-fixing species) in hedgerows along the contour lines of a hill, with the 3-5 metre space between the rows being planted to food crops. The contour planting stabilizes the hillside, preventing soil erosion and gradually building up natural terraces, while soil fertility is improved through cover cropping and mulching the soil with the nitrogen-rich clippings from the hedgerows, which also help build up soil organic matter, retain soil moisture and prevent erosion.

During the first year of sustainable agriculture extension, HADF staff worked mainly with the men, expecting that they would pass on to their wives the new ideas they had gained through discussion, training and a study tour to the successful 7-year-old contour farming system of Uncle In-Kham Khamya in a neighboring district. The hilltribe women seemed to the staff to be quite hard to reach since - although they play a large role in agricultural work and decision-making - they do not traditionally attend meetings or take part in village leadership and community-level decision-making. Also they tend to be shy in the presence of outsiders.

The village men did not, however, discuss the reasons behind the new system with their wives, but simply went ahead and planted contour hedgerows. The women therefore had no commitment to the trees suddenly appearing in their rice fields. In one case, a woman pulled up the hedgerows planted by her husband. Other women passively allowed fires or animals to destroy the trees. These events led to the realization among HADF staff that they needed to reconsider their assumptions about women's roles and the likelihood of men sharing new ideas with their wives, and that their methods needed to be changed in order to ensure that everyone in the village could understand the project and be fully involved.

Without a more participatory process for introducing an otherwise appropriate technology, the program could easily marginalize the women and actually reduce their traditional expertise in, and responsibility for, food production. HADF staff thus began a long process of discussion (still ongoing today) - visiting village homes and talking to both women and men about sustainable agriculture and women's involvement. Sometimes small group discussions were held. A large meeting was organized in each village to discuss the issues involved. Gaining the support of the village elders, both women and men, was very important as the elders wield much influence and their traditional knowledge can help solve problems that arise. For example staff have consulted with women elders to determine whether rice rituals could still be held in contour-planted fields.

The women's development process can't be rushed, staff have learned. Women's meetings must be planned in much more detail than men's meetings and can't be expected to accomplish as much in the same period of time, especially as the women are often caring for their children throughout the meeting. As the men in one village became concerned and resentful when an unprecedented all-women meeting was held, the staff learned that the men have to be kept involved in the ongoing process as their acceptance of the women's activities is essential. With time, it has become accepted that there will be women's groups and women's meetings. In the Lisu and Lahu villages both men and women now come to meetings no matter what the topic or who the meeting is principally for, but in the Akha villages it is still necessary to have separate meetings for women, as otherwise the men take over and the women remain silent.

In Lohyo Village, the HADF teacher began speaking with the Village Committee and elders about the traditional status and role of Akha women, particularly their strong involvement in agriculture, and encouraging women's involvement in village meetings. After discussion with the women's group, and with support from village leaders who were already practicing sustainable agriculture, HADF arranged a one-day study tour of about 20 women to Uncle In-Kham's farm. Their ability to make this trip and to see for themselves the benefits of an established contour farming system greatly increased the women's self-confidence and commitment to the new system. As Akha women spend a lot of time together in informal work groups, they were very effective in sharing their knowledge with others and the practice of contour farming increased dramatically in Lohyo Village - from three families in 1988 to 23 in 1989.

Once convinced, hilltribe women have been very enthusiastic about contour farming, and work alongside the men and youth in the community forest and villages tree nursery, as well as in their own fields. Api Nipa,the shaman of Pakasukjai Village, says, "We women have to think of our children more than men do. Only the land is our security for the future." The commitment of the women to sustainable agriculture may even go so far as to challenge some of the basic traditions of the tribe. Api Nipa, for example, is supporting the Village Committee in pushing the other villagers to fence in their pigs so they won't eat the hedgerows and fruit trees, despite the identification of pigs as "forest animals" that must give birth in the forest. If a pig gives birth under the house - as would inevitably happen were the pigs to be fenced in - both sow and piglets must, according to custom, be killed. One compromise currently being discussed is to fence in all but the pregnant sows about to give birth.

The women have learned a great deal over the past few years and can express their knowledge in simple eloquent words. Says Naboo Eh-deh, a Lahu woman from Jakona Village, "We are doing sustainable agriculture now. Before, we cut and burned the forest and there was soil erosion. Now, we know how to care for the environment. With sustainable agriculture the earth is always moist and fertile. We place the hedgerow cuttings on the soil to be fertilizer and we plant vegetables. The whole village takes care of the trees and we ask permission from the elders if we want to cut one. We know if there are many trees there will be a lot of water. I get very tired when I am walking where there are no trees. When I come home to the trees I feel refreshed. If there are no trees on the watershed there is no water, or there is only a little water that doesn't taste good. The water is the food of the forest so we must take care of it. We shouldn't use chemicals or throw dead animals into the streams.

In the past we didn't think of planting Leucaena or Pigeon pea on the contours but the men went to meetings and got started. At first the women didn't understand the new ideas but now we understand. Now we are more enthusiastic than the men because we want our children to have water forever.

Under the trees we can breathe fresh air. How long does it take for a tree to grow big? But we cut them so quickly. We must think of this and let the tree grow bigger and bigger. If there are no trees we will have many diseases. If there are trees we can live happily and healthily together. In the past we cut the trees and then we had no animals or birds. Now birds are returning as our trees get bigger".

In 1992, 67.2 per cent of households covered by HADF were practicing contour farming on 732 rai (6.25 rai = 1 ha, up from 46.2 per cent) on 489 rai in 1991.

Current initiatives

HADF has continued to work with the hilltribe women, providing training (for example in participatory monitoring and evaluation techniques) and organizing longer field trips in which men and women, elders and youth, can participate together. Even just a few years ago such trips would have been unthinkable, especially for women, and their success is an indicator of how much the women's self-confidence, and the men's support for their involvement, have increased. Village meetings are regularly held, and six-month monitoring and evaluation sessions are conducted by the village leaders, both women and men.

In cooperation with FAO, a time-use study looking at women's and men's lives has been carried out in each of the three seasons of the year to analyze roles and decision-making responsibilities along with the people, to re-affirm to the women that HADF is interested in their lives, and to provide useful data to improve HADF programming. The study has involved interviews, participant observation and follow-up meetings with villagers to reflect on the data. Detailed time-use charts have been prepared. The data collected through the technique of participant observation has proved to be quite accurate, as the observers were all HADF staff who were well-known to the villagers and could speak their language; thus it was felt that the people did not significantly alter their usual schedules. For the interviews and meetings it was essential that men were excluded due to their tendency to speak for the women.

As roads and electricity reach the villages, HADF staff must work with the villagers to help them understand and analyze the potential effects of these new things entering their world, of the new complexities that face them. People were largely equal in the past but the entrance of a money economy can swiftly break down social cohesion and responsibility; the idea of profit and gain can override the idea of family and community obligations. A program of "consumer education" must be developed to help the people begin to analyze how what we buy, what we eat has an effect not only on ourselves but on the environment and global society as a whole. Sources of extra income such as crafts and food processing must be explored as well.

Meetings, study tours, training, education: all the activities carried out in the hilltribe villages are aimed at assisting both women and men to have greater access to information about their community and the outside world, and to have more opportunities to think and plan together, to analyze their roles in the family and the community, and to decide what and how to change.

Village networks

Since 1991, HADF has been assisting in the development of an inter-village network of women from the Akha, Lisu and Lahu tribes which brings women together to share experiences and to discuss issues of importance to them, often issues that would not in the past have been considered appropriate concerns for women. Among the Akha this network has been able to build on the traditional informal women elders' network in which women from different villages keep in touch through inviting each other to village ceremonies.

The two meetings held so far have been very successful in showing that women of different tribes can come together, and that women have a great deal to offer if the opportunity is given. As one of the staff observed, "We often think women can't or won't do something but if we open opportunities for them they often surprise us with their ability and interest."

The emphasis on networking has intensified as the issue of upland resource management has come to the fore. Recently four villages in the HADF project area have joined together in a network called "People's Organizations for Mae Chan-Mae Salong Watershed Conservation" to define a five-year plan for a watershed management system in which 768 rai of the steepest land will be reforested with teak, fuelwood trees, bamboo, Cassia, etc., and allowed to revert to natural forest; the less steep fields will be contour-planted; and the flatter fields with available water will be terraced and turned into wet rice paddies. This decision to take some fields out of production and to undertake major tree planting and restructuring of the remaining fields is based on the villagers' belief that only in this way can they be assured of a sustainable future on the land. In addition, they hope that by proving their ability to properly manage the watershed area they will eventually be granted Thai citizenship and communal land rights. The land, which parallels the government's own Master Plan for

Community Development, Environment and Narcotic Plants Control of the Highlands 1992-96, is being developed in consultation with Thai government support.

While planning this program, meetings of both men and women together were held in the Lahu and Lisu villages, and together the people walked to the fields to analyze how best to manage them. In the Akha villages, separate meetings and field walks were necessary,though a few women would participate in the men's field visits and vice versa. Ongoing meetings will be held to monitor and evaluate the process. The men have agreed that three representatives from each village will meet every three months. The women's process is as yet less clear and tends to be more informal.

Changing roles

The question may well be asked: how have these changes in woman's roles and world view happened so quickly, especially in societies as "traditional" as those of the hilltribes? It may be, once again, that our assumptions are not in tune with reality. The hilltribe societies - both women and men - have never, in fact, been closed off from the outside world. The people have always been in touch with other cultures and have learned from them, adopting and adapting new ways skills that appeared to be of benefit.

Even the adoption of upland rice cultivation - which we automatically associate with the hilltribe people - may have been fairly recent for some villages. Some of the Lahu used to grow mainly chillies for sale and then would buy much of their rice. Many people talk of growing mainly wet paddy rice in Burma, and indeed the Lahu tribe's skill in constructing terraces and the Akha's skills in farming wet paddy are re-emerging as the people, with HADF assistance, convert fields with an available water source to wet rice cultivation.

The hilltribe people are well aware that a rapidly changing world calls for changing traditions and world view. On arrival in Mae Salong, for many villages as recently as fifteen years ago, it must have been evident as soon as the people saw the largely deforested hills (the result of previous waves of farmers and Haw Chinese cutting of trees for fuel to dry tea and mushrooms) that their lives and farming systems must continue to change. With shifting cultivation no longer an option, a commitment to a fixed plot of land must evolve to complement the generalized attachment to and respect for the environment that has nurtured the hilltribe people for generations.

Naboo Eh-deh says, "In the past our elders cut the forest. Now we are the generation that plant trees and conserve the environment for our children". Api Nipa says, "In Myanmar women never had meetings. Now we have meetings. This is good because we learn so many things. People have the same hearts and a meeting brings us together.In Thailand we old women have a chance to learn new things. In Myanmar we died without knowledge. In Myanmar we didn't know much about planting trees. We planted rice and a few fruit trees. Now we know what to do. Now we have more support from the men. We can help each other to plant trees and to stop burning the fields. We must look at our village situation and decide what is good and what to improve. We must help people in other villages too."

It is now more necessary than ever before for the women and men, youth and elders, of the hilltribe communities to each have an opportunity to contribute knowledge, skills and commitment to the task of creating a sustainable future. The process is slow and the barriers are many, but the people of the hilltribe communities are developing the ability to look into that future and to see their important role in shaping the society they want for their children and grandchildren.

Changing policies?

But what if, like a wide-angle camera zooming upwards from the villages, we gather into the picture the whole of Thailand, of Southeast Asia, of the world? The hilltribe villagers cannot solve the problems of their own watershed if deforestation continues apace in other parts of North Thailand, Myanmar, Laos.... as long as a global economy pushes thoughtless and unending economic growth... Their efforts cannot succeed, or be replicated on a large scale, as long as the Social and Economic Plans of the Thai government continue to emphasize the exploitation of human and natural resources in the push to become a Newly Industrialized Country (NIC), while failing to address the issues of human development, environmental conservation and equity. Like the Thai people as a whole, the hilltribe people have traditionally practiced environmentally sustainable systems of farming with nature. Government policies since the First Plan in the 1960s have impinged on the environment and on the traditional way of life of people throughout the country through an emphasis on industrialization, tourism and the chemical-intensive production of monocultured crops for the export market.

HADF is working to strengthen the role of women and the responsibility of the hilltribe people in general towards the environment through the practice of sustainable agriculture and watershed management, but this small effort cannot be enough unless macro government policies begin to provide support for sustainable agriculture and for the right of people to manage their own natural resources. Why, the hilltribe people ask, do we forego the money from cabbages, working so hard to plant contour hedgerows and grow organic rice - and yet we still don't have land rights and citizenship - while others nearby continue to grow huge fields of cabbages drenched in chemicals and are not punished?

Current government policies do not provide for the people's active democratic involvement in community/environmental development and management, but at the same times the government is simply not able to carry out this huge task on its own. Were the government to provide policy-level support for the kind of program that the hilltribe people of Mae Salong, together with HADF, are currently implementing, the hilltribe elders - and community leaders throughout Thailand - would be able to manage the work on their own with assistance from local government personnel where necessary and appropriate.

The work in the hills provides one example of a community-managed program that must be taken to policy level, and indeed HADF, along with similar-minded NGOs throughout Thailand, is increasing its emphasis on policy-advocacy work -beginning with the development and strengthening of grassroots village networks, joining with other NGOs fighting for the same ideals, and finally using every opportunity to carry the words of the people to national and international policy levels.

The answer for us, says Tuenjai, is neither capitalism nor communism, but the Middle Way - people living with people, people living with nature, with "mehta" - that evocative word so hard to translate that can mean goodwill, kindness, mercy.....

TABLE 1: **Project Villages Covered by HADF from 1986-1992**

Village	Tribe	Families	Population
Pakhasukjai	Akha	67	373
Jakona	Lahu	18	110
Jabusee	Lahu	31	186
Lohyo	Akha	42	264
Hego	Lisu	24	206
Mae Tur	Akha	47	236
Total		229	1,375

TABLE 2: Adoption of Contour Farming Practices

Village	1988		1989		1990		1991		1992	
	Fam.	Rai.	Fam.	Rai.	Fam.	Rai.	Fam.	Rai.	Fam.	Rai.
Pakhasukjai	4	10.3	8	25	8	43	24	146	50	220
Jakona	1	4	-	-	2	14	9	29	14	87
Jabusee	-	-	-	-	5	9	14	29	20	50
Lohyo	3	8.1	23	88	27	115	34	189	38	156
Hego	3	2.2	8	16	15	63	16	71	23	99
Mae Tur	2	2.7	2	2.7	6	18	9	25	9	120
Total	13	27.3	41	131.7	63	262	106	489	154	732

NB: Fam. = Families; 6.25 rai = 1 hectare

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Solid Waste Recycling
Kampala City, Uganda

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Statement of problem addressed

Kampala City generates over 500 tonnes of garbage (waste) per day which is supposed to be collected and disposed of by the Kampala City Council (KCC), the only institution responsible for waste collection in the city.

Like most social services in Uganda, the system of waste collection by KCC broke down during the period when the country experienced political upheavals. As a result, refuse accumulated on the streets.

KCC is only able to collect 10-15 per cent per day (between 80-120 tonnes) of the waste from the streets using available facilities and resources. This implies that 380 tonnes/day of waste is left to accumulate. This accumulated refuse is a menace since it turns into possible breeding grounds for rodents, insects and toxic bacteria thereby a health hazard.

Kampala has a population of one million people who generate over 500 tonnes of garbage per day especially in the market areas and housing estates. To reduce health and environmental hazards, the only solution is to recycle the waste generated in the city. SWAG, in recognition of this need, decided to supplement KCC's efforts in waste collection and subsequently engage in solid waste recycling projects.

Approach and methods used

Studies have been carried out in three markets and two housing estates in Kampala, on composition of solid waste. The results were as follows:

Food waste and related garbage	-	80.0%
Paper	-	5.4%
Saw dust	-	1.7%
Metals	-	3.1%
Plastics	-	1.6%
Others	-	8.2%
		100.0%

The method of solid waste disposal is such that all waste is dumped together irrespective of its nature. So in order to embark on a social waste recycling activity, extra costs are being made to educate and sensitize people on the need to separate organic waste from inorganic waste. People's attention is being also being drawn to the economic value of recycling solid waste. This has been through seminars, workshops and mass media. The idea is to involve the community at all levels. Already there are two pilot programmes at Namuwongo and Kinawattaka.

Women's participation in designing and execution of programmes

The Senior Women's Advisory Group on Environment (SWAG), has been very instrumental in spearheading environment protection/preservation issues in the country.

SWAG was conceived as a concrete response to the need for women to get actively involved in matters of environmental preservation through balanced sustainable utilization of resources. SWAG is an NGO involved in all environmental matters such as afforestation, pollution, floriculture, energy, etc. SWAG's strategy is to mobilize and involve women through educational seminars, publicity campaigns and pilot programmes.

SWAG currently operates two pilot projects, one for biogas production and the other for solid waste recycling. The latter is focusing on compost manure production and egg tray production from waste paper. The biggest draw back is the unsorted waste which is brought in at the sites, the reason being that garbage is not pre-sorted at the places of disposal i.e. markets and residential areas. However, SWAG has made efforts to have pre-sorted such that in major markets there are two separate containers, one for organic waste the other for inorganic waste.

Obstacles and/or socio-cultural constraints

General obstacles to SWAG recycling programmes are lack of transport to ferry garbage from market places and residential areas. This forces production costs up since transport hire charges must be taken into account.

Another problem is lack of funds sustain the on-going programmes. SWAG resources (both human and financial) are still limited an therefore need supplementing through loans or grants.

Besides the above, the community mobilizers have encountered socio-cultural problems such as opposition from menfolk in allowing their women to participate in projects or programmes especially those that are income generating. It is still a belief that women should not control money in homes, rather they produce and pass over the proceedings to the men.

Another social problem is that anything to do with waste is looked down upon by many people. The idea of "handling" waste is not attractive because it is regarded as low job fit for the uneducated. This is why several awareness or sensitization seminars have to be organized to inform people on the environmental value of engaging in waste recycling projects. i.e. that value can be added to waste to generate income.

Major development and environment results

Environment and Health

SWAG activities have greatly contributed to a cleaner and healthier environment in and around the city. The collection of garbage from the markets and in residential areas has reduced street litter, rodents and rodents that had become a health hazard.

The compost manure produced is used in horticulture, rearing of livestock which improves nutrition of the people especially through zero grazing schemes.

Employment and Income Generation

The on-going programmes have created many employment opportunities for so many would-be idle people. This is especially so in the sorting of waste stages of production and the collection of garbage from residential areas and markets. These people working in these places are gainfully employment since they earn a living.

Alternative Source of Energy Introduced

Biogas

As already mentioned earlier, a biogas production project has already been started by SWAG. This is to be used for cooking and heating purposes. It is a small pilot project which is intended initially as a demonstration unit from which other projects will be started.

Charcoal Briquettes

Over 80 per cent of the organic waste generated in the city is food and related stuff such as banana peelings. From these peelings women have been shown how to produce charcoal briquettes that have a higher latent heat compared to wood charcoal. This has greatly reduced the need for ordinary charcoal for cooking in homes.

Indirectly, the introduction of alternative sources of energy (biogas and briquettes) will help curtail the rate of deforestation brought about as a result of the need for wood fuel.

The women engaged in production of charcoal briquettes find it very lucrative since they can earn some income out of sales to various people.

Impact of these results on women

The involvement of women in many income generating activities related to environmental preservation, has greatly boosted the social prestige of women in society. This has led to women to gain self-confidence since they are contributing significantly to nation building.

Lessons learned

Garbage disposal programme in cities do not need huge investment. Government should facilitate the private sector and community in garbage disposal. SWAG is doing this with minimum of resources though the results would be even greater if given more facilities.

Recommendations

All on-going programmes are being carried out with minimum data and information. There is need for detailed studies to be carried out to identify the potential of solid waste recycling. Uganda is lacking in appropriate technology to exploit solid waste recycling as a source of income.

Local entrepreneurs in this field should be assisted in participating in these activities.

The Role of Women in the Use of New and Renewable Sources of Energy in the ESCWA Region

Diffusion of Biogas Technology in Yemen: The Development of Women in Mansourit Al-Habeel Village (An ESCWA/UNIFEM Project)

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and

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Introduction

"The Introduction of Biogas Technology in PDRY: The Development of Women in Al-Habeel Village" is the heart of our story. It is a project conceived out of the real needs of people, and in particular women, in one of the poorest villages of one of the least developed countries of the ESCWA region. The project was initiated in January 1989 and was completed by December 1991. During this period an important event took place. The two countries, namely the People's Democratic Republic of Yemen (PDRY) and Yemen Arab Republic, were reunited on 22 May 1990 under the name of the Republic of Yemen. This presentation will refer to the ex-PDRY as southern Yemen.

The last census of 1988 of southern Yemen indicated that the population was about 2.42 millions with a rate of growth of 3.0 per cent and an average population density of 7 persons per sq.km. The fertility rate is 7.8 births per woman with a life expectancy of 48 years. The recorded infant mortality rate is about 126 per 1000 births. The crude activity rate for males 15 years and above is about 35 per cent and the females about 4 per cent. According to the 1990 World Bank Report, the per capita income in 1988 was US$ 430. About 67 per cent of the population live in rural areas and they depend mainly on biomass for securing between 70 to 80 per cent of their household energy needs. Wood and various stalks and straws collected from uncultivated land constitute 88.5 per cent of the biomass used, while crop residues, mainly cotton stalks and animal dung, constitute only 2.5 per cent and 9 per cent respectively.

Mansourit Al-Habeel: a typical village in southern Yemen

Al-Habeel village in Lahaj Governorate is located about 10 km from Al-Hota, the capital of Lahaj. This village consisted of two main sections, namely Al-Habeel and Mansourit Al-

Habeel which were separated administratively during the course of the implementation of the series of biogas projects. The data provided in this part of the paper cover the greater Al-Habeel.

The village consists of scattered groups of houses, near which are located open animal sheds. It has 270 households totalling about 1500 persons, of which 70 households are located in Mansourit Al-Habeel. The area of land owned ranges between zero and 3.5 acres per family. The number of landless families totals 57. The animal holding in the village is about 0.2 animal units per person compared to 0.23 animal units per person for the overall rural sector in southern Yemen. About 16 per cent of the families own more than 50 per cent of the animals with the density of 2 animal units or more per family. An appreciable part of the village water is obtained from underground sources. Latrines of the village are connected to deep pits which pollute the underground water, thus constituting a dangerous sanitary problems.

In Al-Habeel village, as in other villages in southern Yemen, fuel, in the form of fuelwood is collected by women who have to walk distances of more than three or more kilometers each way, carrying in their return from 10 to 15 kg. of fuelwood . Al-Habeel women informed us that during the collection of fuelwood they are exposed to snake and scorpion bites. This fuelwood is burned directly in open stoves without grit or chimney for cooking , baking, and other domestic uses. The combustion in these stoves is incomplete, thus producing harmful smoke containing a considerable amount of toxic carbon monoxide, which accumulates near the stove and in the kitchen. Al-Habeel women also indicated that they dislike baking because it involves a high risk of burning their hands.

In Al-Habeel village, also as in other villages of southern Yemen, women are responsible for cleaning the animal sheds where the fodder is placed on the ground and eventually is mixed with animal manure. Since animals do not eat this mixture, a substantial part of the fodder is wasted. Also this mixture makes the cleaning of the sheds more difficult. The women are also responsible for collecting the dung which is not used as fertilizer because it usually contains large amount of seeds that grow unwanted grass. The women pile the animal manure outside the houses waiting for the annual rainfall to sweep it away. With the year round hot weather, these piles become a source of health hazard to all the community. Both the manual handling of the manure and the presence of its piles increase the health hazards affecting women and children in particular.

Al-Habeel women are also responsible for milking the cows. This activity which is supposed to be a source of health is detrimental to the health of the family since women milk the cows in sheds with unpaved grounds amidst the dung which can not be cleaned out.

In addition, waste water in the village is drained around the houses, forming small ponds of stagnant waste water thus causing an additional source of pollution.

Women in Mansourit Al-Habeel: typical rural Yemeni Women

Al-Habeel women are involved in various farming activities; however, their main domestic responsibility is caring for the children, preparing meals, baking bread twice daily, cleaning the house, washing, sewing and mending clothes. In addition, the women are responsible for fuelwood collection and animal husbandry. They are also responsible for cleaning the animal sheds once or twice a day depending on the animals' daily pattern, collecting fodder, grazing and milking cows twice a day. All these tasks are performed within the polluted environment. It is reported that women and children suffer from respiratory, intestinal and eye diseases. With the heavy workload of women outside and inside the house, they do not have the time nor the skill to provide good care for their children or to acquire new skill to improve their lives.

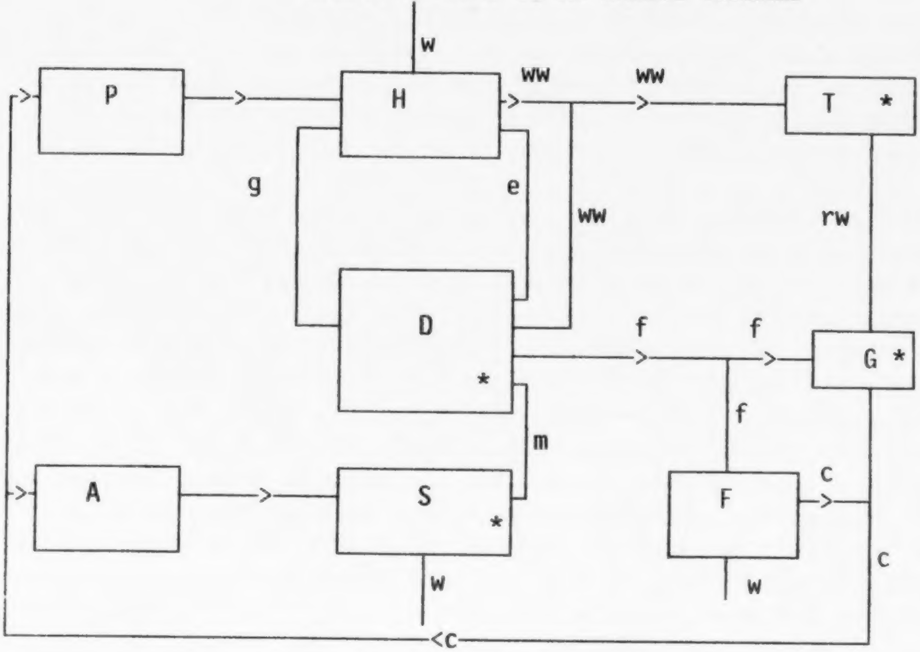
Proper waste management in Mansourit Al-Habeel

The main source of pollution in the village is organic waste, which consists of animal dung, human excreta and waste water from the households. This waste can be properly handled by introducing an integrated biogas system which includes biogas digester, properly designed shed, simplified waste water treatment plant, and latrine, as demonstrated in the block diagram shown in figure 1. A product of this waste management is clean energy source to replace direct burning of biomass, seedless germ-free fertilizer which does not attract insects and flies and which can be used for increasing the fertility of the land and the green area in the village, more efficient use of fodder,and improved sanitary disposal facilities. The treated water, supplemented by the fertilizer, is utilized to irrigate the newly formed home gardens.

Why biogas technology?

Biogas technology was selected for many reasons. The local people can participate in the design, construction, operation and maintenance of this system, which is constructed of locally available materials. The technology is mature and commercially proven and it can compete economically with the other energy technologies using conventional fuels or renewable sources. This technology satisfies a clearly defined need of the villagers, especially women. In addition to energy generation, this technology has other outputs such as reduction of air and water pollution, reduction of health hazards, increased land productivity, alleviation of the burden of rural women, saving of their work time which can be used in the acquisition of new skills and improvement of their quality of life, improvement of the health conditions of the community at large, and introduction of the concept of appropriate technology to the villagers.

BIOGAS SYSTEMS IN AL-HABEEL VILLAGE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P = People

H = House

A = Animals

S = Shed

D = Digester

F = Agricultural Fields

T = Water Treatment Plant

G = House Garden

m = manure

e = excreta

f = fertilizer

g = biogas

c = crops

w = water

ww = waste water

rw = recycled water

Figure - 1

The project itself

The conditions of the rural areas of Yemen, witnessed through different field visits by ESCWA staff, were the major driving force behind formulating and eventually implementing a series of projects on biogas technology, as one of the means of improving the quality of life for rural people in general and women in particular. Throughout the process of identification and implementation,the United Nations Development Fund for Women (UNIFEM) has been a sympathetic and involved partner with ESCWA. Its support to the introduction of this technology was beyond mere financial assistance.

The introduction of this technology to the village went through phases which consisted of both surveys as well as actual field operations. The first phase consisted of a case study on the techno-economic and social aspects of the introduction of biogas technology in southern Yemen. The assessment of these three aspects were regarded as correlated factors that must be taken into consideration in order to achieve the successful introduction of the technology. The technical assessment indicated the need for constructing pilot biogas systems of three different designs in order to select the most appropriate design for the local conditions which include among other factors cost of the construction, the ability of local labour to construct the digesters, effect of ground water on the structure, availability of building materials, and the effect of climatic conditions, especially the temperature, on biogas production. The economic assessment reinforced the need to build the pilot units in order to evaluate the cost effectiveness of each system in terms of the investment in the construction, returns from the gas and fertilizer outputs as compared to the conventionally used fuels and fertilizers. The social assessment demonstrated the values and practices of the villagers especially women, regarding their acceptance of using an unfamiliar technology and using the biogas produced from animal manure and human excreta as a fuel for cooking and baking. It also indicated the social values related to the acquisition of skills by women once they are liberated from fuelwood collection and other hardship responsibilities.

As a result of the techno-economic and social study, ESCWA, funded by the ESCWA Netherlands-funds-in Trust, undertook the construction of the three biogas systems with different digester designs (Egyptian-Chinese, Borda and India designs). The Egyptian-Chinese design proved to be the most appropriate for the village conditions.

The findings of the techno-economic and social case study, the successful operation of the three models, and the enthusiasm of the villagers moved the government to request ESCWA to pursue this activity further by implementing a pilot project in Mansourit Al-Habeel.

In 1988, UNIFEM provided the necessary financial support for the implementation of a two year project entitled: The Diffusion of Biogas Technology in PDRY: The Development of Women in Al-Habeel Village
(PDY/88/WO1). The objectives of the project are to improve the quality of life of women and their families by introducing biogas technology (BGT) within an integrated social and

economic perspective, to generate income, to assess the health, social, and environmental impacts of BGT, and to minimize air and water pollution and other health hazards.

The Implementing Agency, the Ministry of Energy and Minerals (before the unification) was the national counterpart to the United Nations, as represented by UNIFEM and ESCWA. The responsibility of the project is now undertaken by the Ministry of Electricity and Water, the Implementing Agency, in cooperation with the Executive Office of Lahaj Governorate, General Federation of Yemeni Women, and other popular organizations operating in the village, provided the necessary backstopping to the project, including human resources (engineers, data collectors, extension workers, local leaders), transportation, official permits and purchase of necessary materials, administrative support, and mobilization of local committees.

The project implemented in Mansourit Al-Habeel, is basically of a participatory nature. The participation of the local people in planning, monitoring, and assessing the activities of the project was considered a primary factor in adopting the technology and introducing social change especially to the conditions of women. This was translated operationally by the formation of a village committee composed of the local people's organizations, including the General Federation of Yemeni Women,and representatives of the beneficiaries. This village committee undertook the promotion of objectives and activities of the project in the community, participation and formulation of detailed workplan, selection of beneficiaries, site selection for biogas plants, selection of labour force, determining the financial responsibilities of the beneficiaries, solving the problems arising from sharing the output of the multi-family digesters, monitoring the implementation of the extension programmes for women, and ensuring the provision of the necessary requirements from the village for the construction of biogas systems.

In order to assess the impact of the technology on the community at large and women in particular, a base-line data survey of the village was undertaken. It addressed the families, heads of households, and women. The survey confirmed the conditions of rural life described above, thus making the village representative of rural conditions in general. In addition, it revealed that women were ready to acquire new skills and knowledge that will improve their lives and that of their families. It also indicated that the male heads of households welcomed the release of women from their difficult tasks, within and outside the home, and the utilization of the time for their education and improvement of family conditions.

Twenty one biogas systems were constructed in Mansourit Al-Habeel serving 28 families out of 70 families the village; they represent 40 per cent of the villagers . Five units were community units serving more than one family and the remaining are one family unit. These twenty one units are in addition to the four units constructed in Al-Habeel village.

The beneficiaries participated either in cash or in-kind in many aspects of the project. The biogas system introduced into the beneficiaries houses consisted of: the digester, feeding chamber, outlet chamber, animal shed, wastewater treatment plant, simplified drip water irrigation system for the house gardens, simplified gas transportation network, modified stoves and ovens. In addition the kitchens and latrines were modified to fit the biogas system. The beneficiaries contributed in cash about one third of the cost of the system or in-kind through work days equivalent to the same amount.

The female beneficiaries participated with commitment in the extension programme provided by the project. Initially the centre of the Local Defence Committee was provided for the extension activities in Al-Habeel village itself and later the programme was conducted in one of the homes of the villagers in Mansourit Al Habeel itself. About 50 women from the village were introduced for the first time to basic life skills as literacy, health education, home economics, sewing, child care, poultry raising, vegetable gardening and the operation and simple maintenance of the biogas equipment inside the house.

During the project six local extension workers were trained and they implemented the extension programme which was formulated to fit the local needs and circumstances of the village women. The Community Development Centre in Al-Hota, the capital of Lahaj Governorate, provided some of the extension workers along with those from the village.

Impact of the project

The project had a direct impact on the country through its clearly identified outputs. The awareness among decision makers at the national level regarding this renewable energy technology grew to such an extent that the introduction of this technology was included in the national plan for the socio-economic development of the country.

A trained team of engineers, technicians and skilled labour was formed as the nucleus for the diffusion of this technology in other parts of the country. Another team of field data collectors was trained to conduct surveys and a third team of extension workers was trained to implement extension programmes in other villages.

A post-project survey to assess the impact of the introduction of BGT on the social and economic conditions of the beneficiaries, and of women in particular will be undertaken during November 1991. However, one can draw some conclusions regarding the impact of the project on the village community based on the observations of ESCWA staff as they monitored the field operations.

In terms of the environmental conditions in the village, the piles of animal waste and the stagnant wastewater around the houses of the beneficiaries disappeared completely. The houses, especially the kitchens, are cleaner without black smoke on their walls. Connecting the latrines directly to the digesters solved the sanitary disposal problem in the houses of the beneficiaries. The green areas around the houses have become more prominently visible in the village. These improved environmental conditions had direct impact on the quality of life of the villagers. The children have cleaner and safer areas to play. Improvement in the general health conditions of the community was witnessed.

Financially speaking, the villagers who used to buy kerosene or firewood to supplement their energy needs now save money by the use of the biogas. Part of the fertilizer is used in the home gardens, while the major part is transported to the fields after drying which replaced the purchase of chemical fertilizers, and increased the productivity of the land and safeguarded the farmers and the land itself from the adverse effects of chemicals. In addition, the home gardens irrigated by the treated wastewater and enriched by the fertilizer started producing fodder for the animals, vegetables and fruits for household use, thus bringing further savings to the budgets of the beneficiaries. By eating clean, green and abundantly available fodder, the animals in the newly constructed sheds appear healthier and fatter thus producing more milk.

Besides the saving in the family income, the economic benefits of the project also included creating employment opportunities during construction for the local labour in the village and creating working opportunities for the female extension workers from the village. The project also assisted the beneficiaries in generating income from selling excess fertilizers, animals and animal products such as milk.

As a whole, women are the real beneficiaries from this project simply because they are responsible for many of the difficult tasks that are alleviated by the technology. They are relieved from collecting and carrying fuelwood, thus saving them the long and arduous transportation of the fuelwood along with minimizing their exposure to poisonous bites. Also the time spend in baking and cooking decreased thus allowing more time for them to take care of their families and to acquire new skills. During the cooking and baking process, women are not exposed any more to the heavy smoke from woodstoves and ovens, thus minimizing liabilities to respiratory and eye diseases and burning of their hands. By not handling the manure and milking the cows in cleaner environment, the women and children are spared intestinal diseases. Also their children are drinking cleaner and healthier milk.

Through the extension programme, the women began to read and write, acquire new values and skills regarding cleanliness, home management, nutrition, child care, and personal care, in addition to productive skills of poultry raising and home gardening.

The financial analysis of the biogas system revealed that the simple rate of return on the investment can reach 17.2 per cent based on the international prices and 8.4 per cent based on the local prices (which include high taxation) of the building materials. In southern Yemen, once a project is included in the national plan, its components are exempted from taxation. Here lies the importance of the awareness of the decision-makers of the real benefits of this technology and their decision to include such a project in the national plan.

It is to be noted that in the financial analysis, of the project the social, health and environmental benefits have not been given a monetary value. These benefits reflect directly on the expenditure of the government on services related to the social, health, education, and other areas. Emphasis in allocations can then be directed more toward preventive rather than totally curative services.

What did we learn from this experience?

Many lessons, relevant at the macro and micro levels, were learned from this experience, lessons that may be applicable in other operational technical assistance projects. There are many guidelines adopted by funding agencies for the successful implementation of projects; these are not repeated in this part. The points that follow are the ones that are not usually indicated in these guidelines and which we believe are important to point out. Often such points are taken for granted to the extent that we are surprised when the obstacle or problem arises. The following comments are applicable to projects implemented in developing countries whose governmental and non-governmental institutions are often clogged with technical, legal, administrative, and financial bottlenecks. The following constitute some of the lessons learned from this project:

(1) The first most important cooperative relationship that must be established on a solid foundation of trust and respect is that between the funding agency (in this case UNIFEM) and the executing agency (in this case ESCWA) and between the executing agency and the implementing agency within the country. Throughout the life of this project as in any other project, many bottlenecks ware identified at all levels. It was only this positive relationship between the three agencies that minimized the effects of the bottlenecks and often was instrumental in overcoming them.

(2) A clear knowledge of the national plan of the country and the potential position of the project within its context by the government officials and by the funding and executing agencies was crucial in developing the awareness of the decision-makers about the human value of the project. Because this project, though in its pilot stage, can fit in a specific slot in the energy sectoral plan, it was given special attention. Advance knowledge of the legislations governing such activities, money transfer policies and financial rules governing such projects are deemed an asset in project planning and implementation.

(3) Throughout the planning for this project, consultation with the relevant authorities, users and beneficiaries enriched the project's method for implementation and eased the effect of some of the field problems that emerged while implementing the project.

(4) The presence of a strong government official who had a clear mandate and prerogatives at the head of the implementing agency and who was able to delegate important tasks to his staff was crucial in providing the necessary governmental backstopping as they are set out in the Project Document,
especially in allocating national resources (human, material and financial) and in dealing with the bureaucracy for authorizations, permissions, customs clearance etc.

(5) One of the major drawbacks of this project is the "timid" inter-ministerial cooperation at the national level. It is a common trend of governmental bodies in developing countries to avoid real field cooperation since it means drawing on its already limited resources. It was

difficult to establish this cooperation at the ministerial level, but it was easier to establish it at the Governorate level where different relations exist.

(6) Another important bottleneck appears in the relationship between the governmental and the non-governmental bodies at the national level, which are often overloaded with responsibilities and limited in their resources. This was clearly the situation with the General Federation of Yemeni Women whose leadership play active roles in many diverse areas that they were unable to follow the project closely at the local level. However, they were effective in providing some of their members for the field data collection since women were necessary for collecting data from the female members of Al-Habeel.

(7) One of the major assets in implementing this project was the flexibility of management which characterized both UNIFEM and ESCWA. The chronology of activities of the project and the work plan had to be adjusted sometimes due to unexpected factors arising in the field. This was often handled directly by the executing agency and reported to the funding agency in due course.Thus the decentralization of many of the field decisions from the funding to the executing agency assisted in the fairly smooth movement of project activities. This decentralization stems primarily from the close relationship between the two agencies mentioned above. Simultaneously, some flexibility in field operation decisions was granted to the Project Coordinator regarding some of the field details.

(8) Flexibility in budget expenditure vs. allocation within the bounds of the total budget was also established as one of the important areas where bottlenecks can occur but which can be solved by flexible financial management that takes into consideration changing field needs.

(9) At the sub-national and local levels, one can indicate the role played by the non-governmental bodies in the mobilizing efforts for the project. At the same time, having representatives of the community and of the beneficiaries in the Village Project Committee who are not "official leaders" of the local non-governmental bodies helped in giving continuity and stability to the project activities. This village leadership will continue to function within the committee regardless of any changes in the political structures of the country.

(10) It was very important to ensure at the beginning of each phase of construction that all the requirements in terms of people and materials are physically found at the site. This lesson was applied to the second construction phase in view of the delay in obtaining the materials during the first phase. Having the project requirements within the governmental bodies or in the market does not mean that they are available for immediate work and / or use. In actuality, they are not available to the project until they are physically set at the site itself.

(11) One of the main factors that facilitated the training of the local labour on the construction, operation, and maintenance of the BGT system and in the implementation of the extension programme in the village was the common language spoken by the project's

expatriate engineering experts, extension specialist and the local community, especially the direct beneficiaries.

(12) As in any governmental body, local personnel are often shifted from one position to another. This constitutes a real bottleneck in terms of making full use of the national and local staff who were trained in specific skills and who are needed to follow up the project activities. It is important to train more than one person on these skills so that continuity is guaranteed.It is also important to ensure that they transfer their knowledge to their local colleagues so as to benefit from the accumulation of experience.

(13) Working in rural areas of developing countries is known to be a difficult and uncomfortable task. Usually this fact is applied only to the international experts who receive hardship compensations. In our experience, it was felt that the national personnel who are reassigned from the cities into the rural projects deserve some compensation for their work. This compensation, in the form of temporary incentives that are based on the country's salary scale thus not costly, gives some recognition of the efforts of the national expertise who do much of the work under unfavourable conditions.

(14) The social acceptance of a new technology, no matter how simple, by the local community is a very pressing issue in any project that aims at introducing new technologies in a disadvantaged setting. Both the values and customs of the people have to be taken into consideration prior to its introduction. This was made clear by the reaction of the village community to utilizing waste and human and animal excreta for accepting the technology in principle.

(15) The issue of women is crucial to many of these projects. One can approach it too aggressively so that it creates rejection by the locally conservative community or too timidly that it does not lead to any clear results.The issue of women in villages, such as Al-Habeel where the customs allow certain freedom within a set prescribed tasks, requires sensitivity and care. Developing women from the village through education and linking their interest directly with the project objectives will bring to the surface women who can be true representative of the beneficiaries. This needs time and patience.

Conclusion

If this project is considered a success story, it is so because of the collective efforts of many people at the international, national, sub-national. and village level. Most importantly, however, credit goes to the community of Mansourit Al-Habeel, both women and men, who believed in the objectives of the project and who worked hard to make it a reality. Special mention is to be made of the village women who were eager to acquire knowledge and skills and who were committed to improve the quality of their lives and their families. It is also important to give credit to the men of the village who supported the project and its main objective: the development of women in Mansourit Al-Habeel.

Human Resource Management

"The International Senior Corp for Environment"

Alicia Paolozzi
Vice-President
International Council for Women
New York, New York, USA

World-wide, retired and Senior citizens with newly-idled skills, expertise and the will to continue serving their comminities are available for "The Environmental Mission" . This International Network will involve these skills in action and education for the Environment at the community level.

The International Senior Corp for Environment

The International Council of Women, through its 80 National Councils and their Standing Committees on Aging, is committed to the formation of innovative programs to mobilize and use the valuable and retired skills of retired volunteers. These volunteers will labor with dedicated and often passionate will to continue serving their communities in rural and urban areas.

Retired (and or Aging) retirees (often starting at the age of 50) in Centers for the Aging - which are so often tragic parking "garages" for individuals with skills and knowledge at the maximum potentiality to serve - would bring to the Senior Corp their ability to educate, evaluate, monitor, lobby and create inter-generational programs for grassroot-local application.

In blessed civilizations where the extended family still cares for and uses the elders' wisdom and services, the Senior Corp for Environment may seem of no immediate importance, but the growing problem of single and abandoned elders world-wide is destined to grow.

The various use of Seniors as teachers and organizers, and as program executors of commumity programs, are not only useful as such - but since these centers are usually already in existence and mainly self-funding, they are immediately available for action.

"The International Senior Corp for Environment" meets unanimous enthusiasm for their intent to involve these currently often unused skills and talents in service to the Earth and to the Environment.

Some of the organizations interested in collaborating and which are seriously this as an opportunity for total action and communication for environmental action at local levels are:

1. A.A.R.P. (The American Association of Retired Persons.)

2. Banyan Fund (The United Nations sponsored funding mechanism for the Aging.)

3. Local Municipalities and Authorities.(International Union of Municipalities and Local Authorities.)

4. The Program for Seniors of the Missouri Botanical Garden.

5. Physicians for the Environment

The "human face" aspect of these Senior programs will return dignity, purpose and meaning to older individuals who may have come to doubt the real meaning of their lives.

In conclusion, "The International Senior Corp for the Environment", acting through Aging Centers in all forms throughout the world, will harness immediately available skills, volunteer time and revived commitment and self fulfillment for the ultimate mission of the elderly.

For environment itself, this acting-out "in situ" of a wide variety of programs is the most convincing of communications, the most realistic proving ground for community programs, the ultimate goal of all international striving to immediately address the urgent challenge of the world's environment.

The Role of Women in Industrial Development

Babette Klais
Associate Expert
Unit for the Integration of Women
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It is a great honour and pleasure for me to be here in Beijing at this Interregional Workshop on the Role of Women in Environmentally Sound and Sustainable Development organized by the Science, Technology, Environment and Resources Division of the United Nations Department of Economic and Social Development.

Representing UNIDO - the United Nations Industrial Development Organization- , mandated to promote industrialization in developing countries. I will address the issue of industry, environment and women, and then introduce some project proposals in this field.

UNIDO is in the process of orienting its activities towards the implementation of Agenda 21. In this context, UNIDO considers the inclusion of gender issues essential to the effectiveness of its programmes, particularly as they relate to human resource development, capacity building and transfer of technology. In addition, many activities specifically target women. Among these are management training, entrepreneurship development and the development and dissemination of new and improved energy-saving and environmentally sound technologies for rural women.

A major constraint on small-scale entrepreneurs in general is that they lack the know-how and access to technology, finance and information that would allow them to reduce pollution and increase the efficiency of energy and raw material use. However, due to the limited access women enjoy to technology, credit, education and training, they face even bigger constraints than men in this respect. Women are therefore even more likely than men to use unclean technologies. The result can be unnecessary exploitation of natural resources, pollution and damage to women's health.

To promote female entrepreneurship, UNIDO has developed a Training Programme for Women Entrepreneurs in the Food Processing Industry. The concept of this training programme is that such training should be combined with technical aspects of production. It thus aims at providing women simultaneously with the entrepreneurial awareness, management skills and technical knowledge about environmentally sound technologies. The training programme is offered to national training institutions or small industry development organizations in order to strengthen their capacity to provide training programmes for women entrepreneurs.

Another crucial area in this context is the role women play in traditional production activities. Women are responsible for most energy- and labour-intensive domestic processing activities -water and fuel wood collection, cooking, food processing, to name just a few.

A variety of improved technologies have been designed that combine the benefits of reducing energy consumption, while using raw materials more efficiently and at the same time alleviating women's drudgery and contributing to the generation of income for the family. However, due to lack of women's access to resources and information, they are not within reach for the majority of women in developing countries. Women are still forced to use energy-intensive technologies and to over-exploit natural resources.

Before demonstrating this through one case study and outlining some project concepts. I would like to emphasize that technology and even access to technology is not the only issue. As I have just indicated, technologies have been designed, however, if their transfer to women is not accompanied by appropriate support structures such as credit schemes to make them affordable, training programmes in equipment operation, maintenance and repair, then their sustainability is doubtful.

A careful socio-economic analysis of the target group is necessary and the full participation of all parties concerned in the design of any project aiming to transfer improved technologies to women is essential for the success of such endeavours.

The project concepts presented at this workshop concern: (1) Introduction of Improved Cooking Stoves; (2) Small-Scale Waste Recycling; (3) Assistance to Rural Women Engaged in the Production of Low Cost Building Materials; and (4) Assistance to Rural Women Engaged in Salt Processing.

Note on UNICEF Programmes

UNITED NATIONS CHILDREN'S FUND

(UNICEF)

UNICEF has been supporting programmes for women in development for several years now. A review of the achievements made was presented to the UNICEF Executive Board in June 1992.

The policy review document states as follows:

Para 3: The World Summit for Children made a commitment in its Declaration to "work to strengthen the role and status of women". The Plan of Action recognized that ensuring women's equal access to and participation in development and enhancing their status would have a positive synergistic effect on the overall development process of all countries and on the survival and well-being of children.

Para 9: Environmental considerations form a major dimension of any analysis of the situation of women in development. Any sustained improvement in the environment requires women's active involvement and participation because of their role as resource managers, food producers and educators, particularly in women-headed households. Such linkages between women, children and the environment, together with UNICEF programmes of cooperation which address this issue, have been the focus of a number of studies and activities throughout the past year.

UNICEF has in its cooperative programmes addressed a number of key issues concerning women's status and development such as the national policies regarding women and development, the social and legal status, participation and decision-making, capacity-building and training.

UNICEF has started programmes for "children in especially difficult circumstances". But the concept of "women in especially difficult circumstances" has also been articulated by a number of governments in their country programme submissions to the Executive Board, which emphasize the need to develop active, rather than remedial, policies and strategies for poor and disadvantaged women. UNICEF gives assurance of its endeavour to ensure that this would be taken into consideration in its future programming.

Many of the issues raised in the present workshop are already included in both UNICEF's global activities as well as at country levels.

In China, UNICEF's cooperative programmes have so far supported the following:

a. Capacity building of the women cadres of the women's federation;

b. Income generating and poverty alleviation activities for women;

c. Women's literacy and production skills training;

d. Efforts to improve the girl child's opportunities for education and vocational training;

e. Rural basic services programs, including specific activities for the rural women;

f. Advocacy for environmental issues and protection through both in-school and out of school activities for children, the latter being organized through the China Association for Science and Technology (CAST);

g. A water and environmental sanitation pilot project, with special reference to women's issues. This is just a pilot project which would hopefully lay good foundation for further programming;

h. Social statistics and data being gathered to monitor the achievement of the NPA goals for the 90s. All these will be collected and presented by gender.

The women in development programme of UNICEF, since its inception, was planned to be phased out gradually as a separate programme, as it is expected that more and more women related issues would be taken up and included in all the sectoral programmes supported by UNICEF.

ANNEXES

ANNEX I

Interregional Workshop on the Role of Women in Environmentally Sound and Sustainable Development

9 - 15 September 1992

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ANNEX II

OPENING STATEMENTS

Workshop on the Role of Women in Environmentally Sound and Sustainable Development

Beijing, People's Republic of China
9-15 September 1992

Statement by
Mme. Deng Nan, Vice-President
State Science and Technology Commission
People's Republic of China

Distinguished delegates and guests,
Ladies, gentlemen and friends,

Today, we, the representatives of women in over 30 countries, officials and experts from China and the United Nations, are getting together in Beijing in the golden season of autumn to have in-depth discussions, exchange views and compare notes with each other on the role of women in environmentally sound and sustainable development, with a view to exploring workable ideas on this question, which is of common concern to all the women in the world.

At the opening of this workshop and on behalf of the State Science and Technology Commission of China and All-China Women's Federation, I would like to extend my warm welcome to all participants of this Workshop, and express my sincere thanks to friends from the DESD and INSTRAW, who have made relentless efforts for the convening of this workshop.

This workshop is another important meeting on women, environment and development, after the Miami workshop in November 1991. It provides an excellent opportunity for women of various countries to strengthen their links and cooperation in the field of environment and development. It will demonstrate, once again, to the world the importance of women's comprehensive and active participation in protecting the global environment and achieving sustainable development.

At present, environment poses a grave challenge to mankind. The destruction of the ozone layer, the climatic change and global warming, the acid rain and the drastic reductions of the bio-diversity, all these constitute grave dangers to the world's social and economic development. The sharp increase in population and the plunderous consumption of the natural resources have put further pressure on the environment. The degradation of the environment has directly jeopardized the immediate interests of mankind and has put his future in greater danger. Women, owing to their gender and their special role in the reproduction and development of mankind, are in a more painful position, as a result of the environmental degradation. Therefore, it is in the common interest of all countries in the world, and particularly of all women in the world, to protect the global environment and develop economy on a sustainable basis, so that the survival and development of the human race and its future generations can be maintained.

The UNCED held in June this year in Brazil has ushered in a new stage in solving the problems related to environment and development. The Conference was a grand gathering in human history. It adopted the Rio Declaration and Agenda 21 and proposed to establish a Global Partnership. These documents have laid down the guidelines and plan of action for future international cooperation in the field of environment and development.

The world has become more and more aware of the fact that the solution of global environmental problems and the enhancement of environmental management require the participation of women. Women, who constitute half of the world's population, are an important part of the human resources. The special features of women that derive from their gender make their experience, feelings, and skills particularly valuable to environmental protection and economic development, thus making it possible for women to play an important role and make special contributions in this field. For example, the population pressure on the environment and the grave consequences arising from such pressure can be eased and redressed, if women play their full role. In such fields as commerce, culinary and service industries, as well as science, education and health care, which are traditional areas of employment for women and where they enjoy superiority, women have an irreplaceable role to play, because of their experience and skills. Indeed, women are playing a more and more important role in macro-decision-making and management at every level of society.

The world is now undergoing an accelerated process of industrialization. Along with this process, women themselves are also undergoing a process of liberation and development. From health care marriage and family, education and employment to politics and the setting up and running of enterprises, women have gradually shifted their attention from concerns about themselves only to concerns about society, economy and politics. Today, women's concern about and participation in the protection of global environment and the sustainable development of economy signifies a new stage of the development of women themselves. Encouraging the participation of women has become an important part of any national, regional or international efforts aimed at protecting the global environment and achieving sustainable development.

The Chinese government has all along attached great importance to the protection of ecological environment, and has made environmental protection a basic state policy. China has also attached great importance to the role of women in all fields, particularly in the field of environmental protection. At present, China is in a very good state of development. Its economy has entered a period of fast and stable development. We believe that for a developing country, the most important task is to increase the comprehensive national power. But at the same time, due attention must also be accorded to the protection of ecological environment, so as to achieve sustainable development. Faced with the dual task of economic development and environmental protection, we are fully aware of the difficulties, but we also see a bright future ahead of us. Chinese women are known for their resilience and intelligence; it is our unshirkable responsibility to courageously take up the difficult task of environmental protection and economic development, and prop up "half the sky", as is called in China. We are ready to join our sisters in other countries to prop up half the sky of the entire world.

This workshop is an extension of UNCED. It is also a prelude to the Fourth World Conference on Women. Delegates attending this workshop are forerunners in the effort of achieving environmentally sound and sustainable development. Experts from the United Nations have brought to the delegates a wide range of knowledge and experience, while delegates themselves have taken with them typical cases and models from their own countries. Through candid exchange of views and crystallization of collective wisdom, this workshop is bound to be a fruitful one. Such a result will give expression to the desire and interest of women to participate in the efforts to protect environment and develop economy. The concern that women have shown for environment and development reflects their wish to improve the quality of life and maintain the balance of the natural ecological system, so that our future generations will have a good environment to live in. Such concern also demonstrates the care of women for the fate of mankind. It symbolizes the progress of civilization, the progress of human history and the progress of women ourselves. The participation of women that constitute half of the world's total population will bring infinite hope for a bright future to the effort of achieving environmentally sound and sustainable development.

Ladies and gentlemen,

China is an ancient and hospitable country, and autumn is the most beautiful season in Beijing. I sincerely hope that all delegates, all guests and friends, old and new alike, will have a pleasant memory after this workshop and their stay in Beijing.

I wish this workshop a complete success. Thank you.

Workshop on the Role of Women in Environmentally Sound and Sustainable Development

Beijing, People's Republic of China
9-15 September 1992

Statement by
Mrs. Dunja Pastizzi-Ferencic, Chairperson
Task Force on Women in Development, and
Director, Science, Technology, Energy, Environment
and Natural Resources Division
United Nations Department of Economic and Social Development

Distinguished participants and friends,

It is a great pleasure and a privilege to address this meeting on behalf of the United Nations Department of Economic and Social Development, headed by Mr. Ji Chaozhu. I can certainly attest to his and the Department's commitment to activities and initiatives in support of strengthening the role of women in all developmental processes, and our full recognition that only by involving women fully in all aspects of development, can we achieve environmentally sound, sustainable development - an indispensable prerequisite for safeguarding the future of our children and grandchildren in our home - Planet Earth.

We are indebted to the Government and people of China, and to our co-organizers, the State Science and Technology Commission and the All-China Women's Federation, for hosting this meeting. I would like to pay tribute to Ms. Deng Nan and all her associates for their unstinting efforts and enthusiasm during the preparatory phase - both at UN Headquarters in New York and here in Beijing. We have also benefitted from the important experience and commitment of the All-China Women's Federation and other Chinese participants gathered here, and we are looking forward to an ever increasing interaction during and after this meeting.

Our appreciation is also due to the United Nations International Research and Training Institute for the Advancement of Women - INSTRAW - the co-organizer of this Workshop. We do count on INSTRAW's Director, Ms. Margaret Shields, INSTRAW staff and the INSTRAW network to sustain and further develop the results of our work in Beijing.

My heartfelt thanks are directed to all participants gathered here, representing governmental and non-governmental organizations, grass-root movements, academic and scientific organizations, and United Nations bodies and agencies.

Finally, I would like to thank you most warmly for your advice and contributions, and for your case studies and project proposals, which will make our work here both challenging and gratifying.

This meeting is another proof of the global partnership advocated by the United Nations Conference on Environment and Development - and that is why we have been given the honour of opening our meeting in this historic place, the Great Hall of the People. This imposes upon us the serious responsibility of rolling up our sleeves and working tirelessly towards implementing the results of the Rio Conference, embodied in the Rio Declaration and in Agenda 21.

Before proceeding, I have the privilege of informing you that we have been honoured by a message on the part of the Secretary-General of the United Nations, Mr. Boutros Boutros Ghali, which will now be conveyed to you.

* * *

Distinguished participants, dear friends,

One of the overriding functions of the United Nations is to identify and monitor emerging trends and issues. We are all indebted to the United Nations for taking the lead in placing the advancement of women on the world's agenda as early as 1946. Twenty years ago, the critical linkage between environment and development was recognized during the first Stockholm Conference on Environment and Development. Today, environmentally sound, sustainable development is not only a "trendy" word; it is a commitment taken by the entire international community at the World Summit Conference in Rio, embodied in the Rio Declaration and in Agenda 21 - a dynamic, change-oriented action programme for the 21st century. We are still in need of providing proper meaning to the concept of sustainable development. Much must be done to bring this concept to concrete reality, and to elaborate on the close relationships between economic growth, environment and development; between international trade and financial flows; and above all else, to direct greater attention to the crucial connection between environment, population and development.

The world population numbers over 5 billion. Over the next century, the population is expected to more than double, with 90 per cent of that growth in developing countries. We constantly hear about the pressure of population on resources and land. To give just a few examples - the amount of land available per capita for farming has diminished from 0.40 hectares to 0.20 hectares in just two decades. At present, 1.3 billion people lack access to drinking water and 2.3 billion people do not have sanitation facilities. More than one billion people live in absolute poverty, unable to afford a minimum, nutritionally acceptable diet. We are all keenly aware of the trend of feminization of poverty, since approximately one third of all households headed by women fall within the category of the poorest of the poor.

The Earth Summit in Rio acknowledged the close link between poverty and environment, and called for concerted action to reduce global poverty and improve the global environment. The Rio Declaration states that eradicating poverty and reducing disparities in worldwide standards of living are indispensable requirements for sustainable development. It enjoins countries to reduce and eliminate unsustainable patterns of production and consumption, and to promote appropriate demographic policies. It also recognizes that the full participation of women is essential for the achievement of sustainable development.

From our long involvement and experience in the women's movement, and in trying to address numerous issues affecting women's lives, we have learned that the population of a country must be considered as a productive resource - as an asset, and not a liability. The environmental perceptions and experiences of the majority of the world's population - women - can provide an invaluable contribution in elaborating the concept of sustainable development in the post-Rio period. The Nairobi Forward-Looking Strategies for the Advancement of Women to the year 2000 and beyond, adopted in 1985, provide overall guidance towards sustainability. They call for effective women's participation in decision-making; they propose productive systems which respect the obligation to preserve the environment; and they centre on an economic system that will address the needs of the population on a self-reliant and sustainable basis.

There are also innumerable examples of success stories resulting from women's initiatives world-wide, which can bring about much needed developmental change and contribute to developmental sustainability.

Distinguished participants,

The Rio Conference was an unprecedented United Nations Conference. It mobilized thousands of citizens from all over the world to voice their concerns about the future of the planet. With 172 participating governments and about 17,000 people attending the Global Forum, this two-week series of events and seminars opened many new avenues for action.

The question we must now ask is: will world attention and the momentum raised by UNCED be diverted and dissipated by other momentous events which continue to assault humanity - civil war, devastating famine, natural and man-made disasters, the spread of AIDS - or can we maintain our resolve to view the problem of the environment as a global phenomenon, affecting the totality of our well-being, transcending national boundaries, and requiring complex solutions and concerted international cooperation which will need to go far beyond rhetorical palliative. UNCED has shown that we can no longer speak about global environmental challenges without placing them squarely within the framework of combatting poverty, hunger and disease, ensuring for all human beings a better access to education, and healthcare, and without addressing major developmental problems such as trade, debt, development finance, and access to modern and environmentally viable technologies. UNCED has furthermore heightened an awareness among developing countries that environmental concerns should not be viewed as a burden to their development efforts, but rather as an essential criterion for a more harmonious and lasting development aimed at ensuring a better future for the present generation and those to come.

The problems to be addressed, many of which are interrelated, are overwhelming in scope: wasteful overconsumption of energy and other resources, particularly in the developed world; inappropriate development policies, leading to debt, poverty and land degradation; rapid population growth; ecological refugees fleeing desertified land; nuclear refugees fleeing contaminated land, air and water; the burden of debt, resulting in overexploitation of resources and increased poverty; an increasing rate of environmental destruction; loss of forests, pollution of land and water; accumulation of dangerous wastes and emissions; and the exclusion of those who are directly and vitally affected, notably women, from involvement in decisions affecting the quality of their lives, their survival, and the survival, therefore, of our planet.

As for women, it is generally accepted that the road from Rio leads to Beijing, as we prepare for the 1995 World Women's Conference.

The present meeting is an important interim stop along this road. It is devoted to action. In developing guidelines for concrete activities and in considering generic, prototype programmes and projects for internal and external financing, we hope that this meeting will entail at least a measure of transition from concept and theory, to concrete action. In this regard, I fully share the Secretary-General's expression of satisfaction, conveyed moments ago, that one of the first activities following UNCED is dedicated to the theme of women and environment, and that this activity is unfolding in the country which will host the 1995 World Women's Conference.

I will conclude on a personal note with a few words written by a woman whom I have admired since my childhood, and who personifies women's determination and endurance. Helen Keller was an American, but could have been from anywhere. Afflicted with severe physical disabilities, having been blind, deaf and mute, she wrote:

"I am only one; but still I am one. I cannot do everything, but still I can do something; I will not refuse to do the something I can do."

I thank you.

Workshop on the Role of Women in Environmentally Sound and Sustainable Development

Beijing, People's Republic of China
9-15 September 1992

Statement by
Ms. Margaret Shields, Director
United Nations International Research and Training
Institute for the Advancement of Women

Distinguished participants and colleagues,

It is a very great pleasure and an honour to be able to address you here in this historic place. My first visit to China was in 1973 when I came as part of a group of students. I returned in 1983, as a Member of Parliament from my country to learn more of the developments that were taking place at that time. Now I feel very privileged to be able to come back again to take part in a conference/workshop that brings together two very important interests.

Firstly, this meeting will form the first constructive step on the road from Rio. We will be starting to put into action the principles espoused at the UNCED Conference. Secondly it is, as a Conference concerned centrally with gender, an extremely appropriate workshop to be held here, so soon after the decision to hold the United Nations 1995 World Women's Conference here in this great city.

I would like to express our warm appreciation to the organizers of this workshop; they have done a great job in facilitating this meeting and making arrangements not only for our work but also for our comfort. In particular I would like to thank the China Society of Science and Technology for Social Development, the All-China Women's Federation and our partners in this enterprise, the United Nations Department of Economic and Social Development. It is a matter of great regret that the Under-Secretary General for the Department, Mr. Ji Chaozhu is unable to be with us in person. In fact his commitment to this occasion has been only equalled by that of his staff under the direction of Mrs. Dunja Pastizzi-Ferencic, Chairperson of the DESD Task Force on Women in Development and Director, Science, Technology, Energy, Environment and Natural Resources Division of DESD.

The topic we are addressing over the next few days in not just another workshop subject. We are, as we approach the end of the twentieth century, being forced to confront the finite nature of natural resources. We are recognizing - almost too late - that the well-being of humanity cannot be pursued without regard to environmental consequences. We are also beginning to realize the truth that was encapsulated in the Chinese saying "Women hold up half the sky". Slowly we are beginning to understand that women are not the problem. Women are a very necessary part of the solution to environmental problems.

We are also recognizing that the primary needs of humankind for food, water, shelter and security are all closely linked to the environment and that environmental issues cannot be contained within national boundaries.

This is where the United Nations has a central role to play. Beginning with the inclusion of women in the United Nations Charter in 1945, the United Nations has long espoused the cause of women's rights and the inclusion of women in development. The Convention on the Elimination of All Forms of Discrimination Against Women has been ratified by 116 state parties and the important work of monitoring compliance with the Convention continues. The Nairobi Forward-Looking Strategies adopted in Kenya and endorsed by the General Assembly in 1985 spelt out in more detail how the advancement of women might be measured and achieved. The 1995 Conference here in Beijing will be a critical meeting for assessing our success in meeting our own goals and in determining future action for gender equality.

Similarly, on the environment front the United Nations has been playing a vital role in stimulating countries to come together and negotiate sound solutions to problems that concern and impact on us all. The most important conference for women was the Global Assembly held in Miami, at which a wealth of material was brought together in the form of case-studies. Women who had developed solutions to local and regional environmental problems came to Miami and described, in an impressive series of workshops, the process of mobilizing people at the grass-roots to solve environmental problems.

The Global Assembly was immediately followed by a much larger open Conference, the World Women's Conference for a Healthy Planet that concluded with a strong political statement incorporating women's needs for Agenda 21- a statement that was presented to the Secretary-General for UNCED, Maurice Strong.

And then there was UNCED itself, the largest conference ever held under the banner of the United Nations and preceded by months of preparatory meetings and negotiation. Some have expressed disappointment about the outcome of UNCED, that not enough was achieved, that the decisions were not clear enough. Perhaps we should think again. It is better to look at UNCED as a beginning rather than an endpoint, where some enormously important decisions were reached and where the ground was cleared for some even more important actions.

INSTRAW was involved both in the lead-up to UNCED and, of course, in the many women's meetings. We have had an important role in developing materials that can assist governments and others in addressing the issue of inclusion of women in development. Our long-term concerns with women, water supply and sanitation and women and new and renewable sources of energy are now located under the broader rubric of gender, environment and sustainable development. In fact, several of our other programmes are also fundamental to solving the problems of sustainable development for all. You will discover, for example, that we are seeking funding for a project designed to establish techniques for measuring the extent and value of unpaid work- as essential tool for future development planning. In addition, we already have training materials available designed to raise awareness of the link between women and development and demonstrating ways in which the experience and knowledge of women can be better utilized at all stages of the development process. We also have important collaborative research programmes being planned with the aim of identifying effective and practical strategies for change that include women as equal partners in the process of sustainable development.

That brings us to the topic of this workshop. We have come together from many parts of the world to consider " Gender, Environment and Sustainable Development". Our task is to review this topic and look at the ways in which we initiate action on the UNCED principles. Chapter 24 of Agenda 21 talked of the global action for women towards sustainable and equitable development. Our job is to turn those words into reality by selecting projects for funding. The projects are diverse. There are many for your consideration: some are practical, others more theoretical; some are large and some are quite small. They all have one thing in common. They are designed to bring together the twin goals of the advancement of women and achievement of a sustainable environment. We could not have a more important task. Good luck! I believe that the combination of experience, wisdom and energy that you, as participants, bring to this meeting will ensure that this workshop will be seen as an important milestone in our efforts to creating a healthier planet.

Workshop on the Role of Women in Environmentally Sound and Sustainable Development

Beijing, People's Republic of China
9-15 September 1992

Statement by
Ms. Tsu-Wei Chang, Coordinator for Women
Policy Branch
Technical Cooperation Policy Division
United Nations Department of Economic and Social Development

Distinguished participants, ladies and gentlemen,

I am pleased to recognize that this Workshop is the first concrete step taken in support of strengthening the role of women in sustainable development following UNCED. It is in full conformity with the Nairobi Forward-Looking Strategies (NFLS), the various resolutions of the legislative bodies of the United Nations, the Rio Declaration and Agenda 21 adopted at the Rio Conference. It is particularly fitting that this workshop is taking place in Beijing, in view of the forthcoming UN World Conference on Women, to be hosted by China in 1995, for which this is an important preparation.

Women, environment and sustainable development is an internationally recognized agenda item. As a general concept, it encompasses various areas such as: agriculture, natural resource conservation, population, human health and other sectoral issues that will be presented during the course of the workshop. The linkage between women, environment and sustainable development is now increasingly recognized. More women are perceived as environmental managers and a vital part of the solution to the world-wide crisis. However, the methodological linkages between micro and macro levels, and the cross-sectoral issues between women and sustainable development are lacking. One of the ways to bridge the missing gap is through concrete, pragmatic, technical cooperation programmes and projects, which will be the major focus during the workshop.

The long-term objective of the workshop is to explore approaches and modalities designed to ensure environmentally sound and sustainable development, particularly in rural areas, focusing on the role and involvement of women.

The immediate objective of the workshop is to identify, for future financing by donors on a multilateral and bilateral basis, and eventual implementation, replicable, sustainable and visible technical cooperation programmes and projects which will ultimately ensure that the role of women, including their environmental perceptions, are fully incorporated into the design and implementation of policies, programmes and projects related to environment and sustainable development, particularly in rural areas. Obstacles, such as socio-cultural constraints which may impede women's full involvement in achieving environmentally sound and sustainable development, will also be identified, as well as strategies to overcome these constraints.

Within the scope of this workshop, particular attention will be paid to elaborating some of the methodological approaches needed to strengthen and broaden the involvement and participation of women in the environmental aspects of sustainable development. Such approaches will concentrate on enhancing the productive role of women as agents of development, and will address issues relating to women's involvement in project and programme planning and management. Research and data on women, environment and sustainable development and modalities for intensifying the participation of women in education and training processes will be analyzed. The need to involve women in the selection and use of environmentally sound technologies and the small-scale individual and collective entrepreneurial income-generating activities will be discussed.

Within the framework of Agenda 21, the workshop will direct attention to the development of programmes and projects to further the role of women in mitigating the effects of environmental deterioration with regard to specific substantive sectors. The agenda of this workshop will cover a number of the cross-sectoral substantive issues, such as: methodological approaches towards strengthening the role of women in environmentally sound and sustainable development; the Chinese experience in promoting the role of women in sustainable development; women and sustainable development; the interrelationship between women and population issues and the impact of population pressures on the environment; the role of women in environmental decision-making, planning and management, including the management of waste; the involvement of women in sustainable rural development in terms of accessibility and food-related research to women farmers, and access to credit; participation of women in the selection of ecologically viable technologies in relation to household energy; involvement of women in methodologies and technologies designed to achieve an environmentally sound and sustainable development of water resources; and methods of increasing women's involvement in environmental improvement through the promotion of a more active role of women in small-scale mining techniques. Particular attention will be paid to the development of guidelines on strengthening the role and participation of women and formulation of generic programmes/projects linking women, environment and multisectoral development. One of the most crucial issues will be discussed which focuses on financing of programmes/projects linking women and sustainable development.

The agenda may ambitious, covering various aspects of women, environment and sustainable development. The topic is complex; it implies cross-sectoral linkages and participatory approaches. It includes all aspects of women and the environment within the context of economic development as well as the effects that the global environment has upon their lives. It demands a holistic approach on behalf of development planners, policy-makers, NGOs, women's organizations, the private sector and all other actors in order to transfer women, environment and sustainable development from a general concept into pragmatic actions at all levels

Workshop on the Role of Women in Environmentally Sound and Sustainable Development

Beijing, People's Republic of China
9-15 September 1992

Message by
Filomena Chioma Steady
Special Adviser on Women, Environment and Development
to Mr. Maurice Strong, Secretary-General of UNCED, and
Senior Programme Adviser to the UNCED Secretariat

Greetings to the people of China and to the distinguished delegates and participants at this Interregional Workshop! Please accept my apologies for not being able to attend this workshop which is designed to initiative some of the most significant follow-up activities of the United Nations Conference on Environment and Development, the Earth Summit held in Rio de Janeiro in June this year. As you know the main theme of the conference was the linking of environment and development in such a way that sustainable development can be promoted and safe guarded. The conference recognized the importance of women's economic, social and environmental contributions in ensuring this linkage and emphasized the role of women in the UNCED process as well as in the programme of action which it endorsed for ensuring sustainable development.

The main output of the conference was Agenda 21 - the comprehensive programme of action for ensuring sustainable development. In addition there were two conventions, namely the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity. An alternative statement on forest principles was also adopted as well as the Rio Declaration which contains a principle on the role of women. Principle 20 of the declaration states: "Women have a vital role in environmental management and development". Their full participation is therefore essential for achieving sustainable development".

The timing of this workshop so soon after the Earth Summit as well as its venue will begin to pave the way for the fourth UN conference on women to be held in Beijing in 1995 and underscore the linkage and significance of these two international events for women.

The Earth Summit was an encouraging landmark event for women in that it achieved consensus on the important role of women in promoting sustainable development and recognized the need for strengthening women's expertise in the fields of environment and development as well as enhancing their legal and administrative capacities for decision making and promoting managerial roles for women in the fields of environment and development.

In its recommendations, The United Nations Conference on Environment and Development affirmed the validity and relevance of the Nairobi Forward Looking Strategies for the Advancement of Women and the Convention on the Elimination of All Forms of Discrimination Against Women. It also endorsed a number of activities in Chapter 24 entitled "Global Action for Women Towards Sustainable and Equitable Development" which contain important and intrinsic linkages to the 1995 women's conference including a request that governments submit a review and appraisal report of progress made in the area of implementation of the activities endorsed in this chapter of Agenda 21 to the 1995 world conference on women. The 1995 women's conference will no doubt elaborate and strengthen action for women in these areas as it continues to promote the themes of the UN Decade for women - Equality, Development and Peace. In addition to the special programme area on women which emphasizes policy and management related activities as well as human resources development and capacity building measures, etc., Agenda 21 extensively incorporates activities for the participation of women in sustainable development in its sectoral and cross sectoral chapters and in the section on the means of implementation. While all the chapters are important for women, the sectoral chapters of greatest relevance to women are those dealing with measures to promote sustainable agriculture and rural development. The majority of women in developing countries live in rural areas where they play important productive roles and are essential managers of natural resources on a practical day to day basis. When the environment is degraded through excessive commercialization policies or the application of inappropriate and environmentally unsafe technologies and inputs, their productive roles are undermined as well as their livelihood and well-being.

There are several other chapters in Agenda 21 which are also of utmost significance for women, particularly those living in the rural areas. These include the chapters on freshwater, deforestation, land resources, biodiversity, drought and desertification and chapters which contain programme areas on the reduction of and sustainable management of all kinds of waste as well as the control of toxic chemicals in the workplace and in the home. Combatting poverty is a global challenge and an essential requirement for ensuring environmentally sound and sustainable development. Poverty exists in both rural and urban areas but rural poverty is particularly oppressive because of the general tendency for political power and resources to be concentrated in the urban areas and to be controlled by the male political elite who also tend to live in the cities. The conference recognized the specific vulnerabilities of women and children and agreed on an important objective, namely, the creation of a focus in national development plans and budgets on investment in human capital. I would like to suggest that this workshop develop some of the initial guidelines for the modalities that would help governments develop this focus and ensure that significant resources and efforts be directed at investing in the female capital in their respective countries.

Special policies and programmes need to be directed towards rural areas, the urban poor and women and children. In a programme area entitled "enabling the poor to achieve sustainable development", Agenda 21 proposes many activities for combatting poverty at the community and local levels and contains recommendations for immediate measures and a long term strategy for which popular participation will be essential.

Preparing women for decision making roles in the fields of environment and development would require action on several fronts. In the first place, women should be included as decision makers in the various initiatives that will be undertaken as a follow up of UNCED. This was among the most important recommendations of the Conference. Short term and long term strategies will be required to achieve this. In the short term, governments can be encouraged to develop rosters of women leaders in activities related to all the programme areas in Agenda 21, recognize their contributions publicly and ensure that some of them are nominated to serve on committees, boards and bureaux dealing with the implementation of Agenda 21 as well as with the monitoring of the conventions generated by the Earth Summit. A long term strategy would require a change in the education system towards greater gender equity at all levels as well as reorienting education towards sustainable development. Special incentives and measures to remedy long term gender based discrimination and eliminate all social and behavioral obstacles against the advancement of women would also be required.

In the final analysis, promoting environmentally sound and sustainable development means empowering people and one of the most effective ways of doing this is to empower women whose multiple social roles can have lasting development implications and stimulate a multiplier effect in communities as well as at the national, regional and international levels.

The short term and long term objectives of this workshop are extremely relevant and challenging and are needed to fuel the action that is necessary for the effective implementation of Agenda 21. Ensuring the linkage between women, environment, sustainable development and technical cooperation is the important task which now lies ahead of you.

I am sure you will accomplish this important and challenging task with flying colours. I would like to wish you every success in these very important deliberations. I would also like to take this opportunity to thank once again all those who supported the efforts of the UNCED secretariat, particularly its work on women, environment and development.

Thank you.

Workshop on the Role of Women in Environmentally Sound and Sustainable Development

Beijing, People's Republic of China
9-15 September 1992

Statement by
Mr. Arthur N. Holcombe, Resident Representative
United Nations Development Programme

Distinguished representatives of the People's Republic of China, friends and colleagues of governmental and non-governmental organizations, and of the United Nations System, distinguished participants, ladies and gentlemen,

I am pleased to convey, on behalf of the United Nations Development Programme, our best wishes and warmest greetings to you and to all participants at this Seminar on the Role of Women in Environmentally Sound and Sustainable Development.

I am especially gratified to see present today the Chinese Society of Science and Technology for Social Development and the All-China Women's Federation, who, together with my colleagues from the United Nations Department of Economic and Social Development and from the United Nations International Research and Training Institute for the Advancement of Women, have organized this Workshop.

It is particularly relevant that this Workshop on the Role of Women in Sustainable Development is being held in Beijing as this will be the site of the 1995 Conference on Women. The UNDP office here will provide direct support to this meeting to which we attach great importance.

At the recent UNCED Meeting in Brazil, the role of women in sustainable development was prominently featured. Principle 20 of Agenda 21 approved at the Earth Summit notes the vital role women play in environmental management and development; their full participation is of course essential to achieve sustainable development. We are currently in the process of working with the Chinese Government on a new UNDP initiative - Capacity 21 - a global capacity building programme aimed at promoting and supporting the preparation and implementation of sustainable development action plans. We will play special attention to women's needs and capabilities in the national process of capacity building.

UN Agencies here in China are very active in promoting WID. UNDP currently supports income-generating activities specifically targeted at women in the poor and remote areas in Shandong province, and increasing the role of women in development represents one of the five multi-sectoral themes which pervade UNDP's Third Country Programme (1991-1995) which will deploy a total of approximately US$189 million over a period of five years.

The aim is to further integrate the concerns of women within the overall programme with particular emphasis on rural economic production and social development.

The United Nations Development Fund for Women (UNIFEM), which was established under the authority of the Administrator of UNDP to serve as a catalyst in ensuring the appropriate involvement of women in mainstream development activities and to support innovative and experimental activities benefitting women, is also funding two projects in Shandong province linked with the UNDP assisted project. The projects aim to provide women entrepreneurs with the skills necessary to run small businesses through credit assistance in the form of a revolving fund loan fund. UNIFEM is also finalizing a project proposal to assist China's State Statistical Bureau to produce gender specific data.

US$9.3 million has been allocated by the United Nations Population Fund (UNFPA) for projects aimed at improving women's economic and educational status in ten (10) provinces, under its Third Country Programme. These projects, executed by the Food and Agriculture Organization (FAO) and the International Labour Organisation (ILO), provide credit and training for women to establish or improve township enterprises. In addition to creating employment, the projects provide literacy training, skills and management training, establish women's savings groups, maternal and child health care and family planning, as well as day care.

ILO, guided by its Plan of Action on Equality of Opportunity and Treatment of Men and Women in employment, is making every effort to ensure that related issues are taken into account in all ILO programmes and projects, with priority activities focused on the access of women to education and training in all sectors, including industry, service and management. In China, top priority is given to women in rural areas.

The World Food Programme (WFP) has realized that unless women engage in more productive income-generating activities their workload in the traditional farming sector will not be reduced. Under the initiative of the UN Joint Consultative Group on Policy, studies have been conducted to initiate a women-in-development sub-project in a WFP-assisted project in Yunnan, expected to include the following activities: garment, handicraft and silk production, and pig raising and beekeeping. In October, WFP will be sponsoring a WID workshop to promote women in management of their field programmes.

The United Nations Children's Fund (UNICEF), recognizing the direct bearing of women's education and income levels on the welfare of children, has allocated US$6.5 million to women-in-development related activities out of a total allocation of US$80 million over a five-year period 1990-1994. Out of this amount, US$1.35 million is being allocated to help women in the poor and remote areas to improve their production, marketing and management skills, literacy and knowledge of child-rearing. Eighteen (18) such projects, centering on food production and handicrafts have already come on stream in 1990. Through these projects, the women's average income has increased by one-third to over Yuan 300 per month. UNICEF also helps young drop-outs return to schools and conduct functional literacy cum vocational classes for female illiterates. In addition, a long-standing programme of cooperation between UNICEF and the All-China Women's Federation (ACWF) provides financial and technical support to early childhood development, family education and the promotion of the rights of the child, including those of girls.

During this Workshop, you will be discussing the financing of programmes and projects linking women and sustainable development. In this connection, UNDP has established, within its Special Programme Resources (SPR), an allocation specifically intended to assist our field offices in obtaining information on the distribution, mandate and terms of reference, and organizational strengths of WID capacities at national and regional levels. In the field of environment, these funds are targeted to support the formulation of environmental plans and policies and strengthen institutional and technical capacities; ensure that individuals are equipped with the skills needed to make informed choices about the environment; and, in general, to support global, regional and special environmental initiatives.

In developing activities for SPR funding, UNDP collaborates closely with other United Nations bodies, including the United Nations Development Fund for Women (UNIFEM), an organization with which we have been proud to be associated in view of its efforts in supporting innovative and experimental initiatives for promoting women's involvement in mainstream development, and which has been actively incorporating environmental issues into its operational activities.

UNDP is also a co-manager, together with the World Bank and the United Nations Environment Programme of the Global Environment Facility - a pilot programme established to provide grants and low-interest loans to developing countries for environmental management, particularly in the areas of protection of the atmosphere, biological diversity, protecting the ozone layer and protection of international water bodies from pollution. Some $60 million has been approved for China, including $15 million, through UNDP, in the areas of coalbed methane recovery, and strategies to remove atmospheric pollution from coal burning and other sources. We hope this programme will continue to expand and offer new opportunities to employ women in management and technical roles.

UNDP has been pleased to support a special project, Promotion of the Role of Women in Water and Environmental Sanitation Services - known to many of you as PROWWESS, which was launched in 1983 with financial support from the Governments of Norway, Canada, Finland, the United States and UNDP. PROWWESS has now merged with the UNDP/World Bank Water and Sanitation Programme, and continues to devote attention to expanding women's participation in water and sanitation issues in terms of specific projects, training activities and publications.

I have made mention of only some of the initiatives in which UNDP is involved, which reflect our continuing commitment to respond actively and concretely to the follow-up to UNCED and to many of the issues raised in Agenda 21. The Workshop being convened here today, and the action-oriented content of its agenda, will constitute one significant step along the road from Rio into the future, in the constantly evolving process of achieving sustainable development. UNDP is pleased to play a role in this process. I wish you all possible success in your deliberations.

Workshop on the Role of Women in Environmentally Sound and Sustainable Development

Beijing, People's Republic of China
9-15 September 1992

Message by
Joan Martin-Brown
Special Advisor to the Executive Director
Global Assembly Coordinator
United Nations Environment Programme

Delivered by
Waafas Ofosu-Amaah, Managing Director, WorldWIDE Network

Your Excellencies, honoured guests, ladies and gentlemen,
my name is Waafas Ofosu-Amaah. I am Managing Director of the international organization WorldWIDE Network, founded in 1981 to advance women in environmental management. Today, I am also honoured to be here representing the United Nations Environment Programme on behalf of Joan Martin-Brown, Global Focal Point for UNEP's Outreach to Women. For the past decade we have worked very closely together on many initiatives -- most recently, working almost around the clock for over 18 months to organize the Global Assembly of Women and the Environment -- Partners in Life. She deeply regrets she could not be here, and invited me to share her remarks with you. They are as follows:

Ladies and gentlemen,

I deeply regret that I cannot participate in this important workshop, and wish to take this opportunity to congratulate the State Science and Technology Commission of the Government of the People's Republic of China, the UN Department of Economic and Social Development, and its Task Force on Women in Development, so ably directed by my friend and colleague Dunja Pastizzi-Ferencic, and INSTRAW, led by another friend and colleague, Margaret Shields.

Less than ten weeks ago in Rio, the Earth Summit gave the world a blueprint of not only what is possible, but what is essential for survival and justice. It affirmed, with clarity, the importance of women in realizing a more just and healthy world. This workshop, convened so soon after Rio, demonstrates the willingness of women to put their hearts, their minds and their hands to the tasks of Agenda 21. UNEP is grateful to the organizers of this workshop for such leadership and is proud to be included.

During the past seven years, UNEP has enjoyed significant assistance from both governments and members of the UN family in organizing four regional assemblies on women and the environment, and the Global Assembly held last November in Miami. We are not strangers to what women can accomplish together. UNEP's realization of its mandate from the 1985 Nairobi Women's Conference on environmental management simply could not have been realized without the critical assistance of UNDP, INSTRAW, the UN Centre for the Advancement of Women, UNIFEM, UNIDO, IFAD, UNICEF, OECD, DPI, UNCED and the World Bank. Representatives of these organizations have been meeting on a regular basis for over two years to support each other.

We all work with non-governmental organizations. These partnerships, such as UNEP's with WorldWIDE, are essential, as it is only through such alliances that we are able to find the many women to whose service we must dedicate our work, women in the communities, villages, cities, towns and rural areas. The challenge to UNEP is to assure that our efforts empower the capacities of women to meet human needs by enhancing the capacity of each ecosystem to sustain life.

UNEP must engage women with visions for a better world, and in ways which affirm their priorities. For women are on the front lines in battles against diseases borne in water systems, the relentless advances of deserts, the lost territories of coastal areas and mountainsides, assaults from air pollution, toxic wastes and the absence or contamination of food supplies. Women are the work's environmental foot soldiers, encountering everywhere the many faces of injustice in the guise of somebody else's "development" agenda. They share the knowledge of sicknesses imposed by unhealthy ecosystems, and the price of ignorance resulting from their own and nature's exclusion in development decisions.

Women and the environment are the shadow subsidies of almost every society; both are undervalued. The Earth Summit challenged the world to revalue both. This can only proceed if women are at the core of the revaluing process. Thus, to only describe women as victims, while in far too many cases accurate, denies women, and thus men, the enormous capacity women have to literally change the world for the better, not only for themselves, but for everyone. By the sheer force of their number, on behalf the human population, they can advance or retard the best, or the worst, of plans.

The intellectual and conceptual contributions of women in thinking about the relationship between nature's ecosystems and the well-being and health of people, has been on the cutting edge throughout time, as women have been the traditional managers of proscribed (or fixed amounts of) resources. More recently, we know of the innovative capacity of women through such efforts as the Greenbelt reforestry project of Wangari Maathai, or Indira Gandhi's critical identification of the vicious cycle of environmental degradation and poverty, or through the world renowned book by Rachel Carson, Silent Spring, or through Barbara Ward's (Lady Jackson's) important pioneering work on environment and economics which formed the intellectual base for the 1972 Stockholm Conference on the human environment, or through the socio-anthropological work of Margaret Mead, which led to better understanding how ecosystems shape human cultures, behaviour and values. Women have coined the phrases environmental refugees, public awareness, eco-justice, environmental bankruptcy, and are doing the most innovative environmental management at the community level where it has proved sustainable, affordable, and repeatable, -- and women defined those criteria.

The importance of partnership among women from around the world, and the importance of women's intellectual contribution of solutions leading to sustainable development, means that many more women, as environmental managers, must be fully engaged in economic, social, and development solutions, which in turn leads to the importance of this workshop. The promise of this event is in the engagement of the creative capacities of you who are here, connecting your experience and demonstrated capacities to the challenges of environmental management and sustainable development to other essential sectoral issues of substances.

Women must not only become more scientifically and ecologically literate, but they must also develop new methodologies, research, and analytical tools to be applied to environment and sustainable development; and compel others to engage and include women in these processes. The UN Department of Economic and Social Development is well positioned to advance this work, and to fully engage women in assessing the roles of economics, science, energy, technologies, transportation and other sectors as related to environmental management and sustainable development. New methodologies must also include assessing other sector issues related to consumption and population factors in advancing sustainable development.

The focus of this workshop extends and refines UNEP's past regional and global work on the "how', the "where", the "why", and the "what", women are doing in energy, water, waste and environmentally friendly systems, products and technologies. We are gratified that the Global Assembly success stories have been incorporated into this event. It is illustrative of the cost-effective coordination and cooperation among women in the United Nations system.

Furthermore this workshop will certainly contribute to the documentation needed on environmental management for the UN 1995 World Conference on the Status of Women. Finally, we are confident that it will also complement our aspiration that every country in the world, over the next 48 months, will convene a National Assembly of Women and the Environment as an essential effort to follow up to UNCED. We look forward to receiving your workshop findings and guidelines and pledge to integrate these into the work of UNEP so as to support and advance your important contribution.

Thank you, ladies and gentlemen.

Workshop on the Role of Women in Environmentally Sound
Interregional Workshop on the Role of Women in Environmentally Sound and Sustainable Development

Beijing, People's Republic of China
9-15 September 1992

Statement by
Mme. Guan Tao, Secretary-General
All-China Women's Federation
People's Republic of China

Ladies and gentlemen,

Today, women representatives from different countries of the world, brought together by joint efforts of the Department for Technological Cooperation of the National Commission on Science and Technology and All China Women's Federation, have convened here to discuss issues of global pollution-free environment and continued progress. The concern shown by women for environment and progress is an indication of their heightened awareness for a better environment and their concern for the destiny of humankind and themselves. It is also a mark of civility. The involvement of women, who account for half of the world's population, will bring much hope for the endeavor for pollution-free environment and continued progress. The involvement of Chinese women, who command huge numbers, will undoubtedly be of great significance to the furtherance of this worthy cause.

The convening of this symposium in Beijing will prove to be a great boost to environmental protection as well as women's cause in China. It also provides a fine opportunity for China to know more about the women of the world and for the world to know more about Chinese women. I would like to offer my warmest congratulations, on behalf of the National Commission on Science and Technology and All China Women's Federation, on the opening of "The Interregional Workshop on Women's Role in Environment and Continued Progress. I would also like to avail myself of the opportunity to make some comments on the progress of the Chinese women and their contribution to, and achievements in, environmental protection and continued progress.

I. Chinese Women in Progress

Women in old China were trapped in a dire situation under oppression by political governments, religious orders, family hierarchy and male dominance. After the founding of new China, they began to see their fate undergoing unprecedented change. The Chinese Constitution stipulates that "the women of the People's Republic of China shall enjoy equal rights as men in political, economic, cultural, social and family aspects". The national government has attached great importance to the advancement and progress of women and deemed the extent of women's liberation as an important marker of a civilized society. The socialist system has created favorable conditions for the progress of Chinese women who have now made remarkable achievements in almost all areas of endeavor.

In terms of women's participation in the political process and the management and supervision of community affairs, women in China have elevated themselves from a status of mere home-making and dependency on men to achieve greater political involvement. They now enjoy equal political rights as men and are actively involved in the national political process. Women account for 21.3 per cent of the total number of delegates to the national people's congress, with a higher percentage for regional people's congresses. A considerable number of women are in supervisory positions at the various levels of government. There are three vice chairwomen for the national people's congress and the national political consultative conference, three female ministers and 11 vice ministers in the national government, II female vice governors and 156 female mayors and vice mayors. There are thousands of women who hold positions of, or above, the county mayor level or equivalent official rankings. The total number of women in various government positions has climbed from 366,000 in 1951 to 9.6 million in 1990. The Chinese women's political awareness and ability for participation in political process has undergone continuous enhancement.

Wider employment opportunities for women have enabled them to participate more in social and economic activities, thus gaining an economic independence which has also enhanced their social standing and status within the family. Shortly after the founding of new China, the number of women with employment in urban areas was only 2.6 million, a mere 7.4 pr cent of the total employment figure. However, by 1990, the number has reached over 52.6 million, spread over a wide spectrum of employment from manufacturing, commerce, catering, distribution and storage of goods, education, culture and arts, radio and television broadcasting, agriculture, forestry, animal husbandry, fishery and water conservancy. the employment figure for women has accounted for 37.6 per cent of the total work force. The employment rate for women in China's large - and medium-sized cities has reached 90 per cent. In rural areas, 189 million women are involved in the production process, accounting for 50 per cent of the total rural work fore. Over 50 million of the female rural work force are employed by manufacturing firms in small towns. Since the start of reform in China, a considerable number of women managers and entrepreneurs have emerged. Like all other ambitious women in China, they are working with unrivaled devotion and extraordinary skills and talent in the nation's economic construction.

The Chinese government has also attached great importance to education for women. In old China, a woman with no talent or education was deemed as virtuous. A great majority of women were illiterate. In new China, however, women enjoy equal opportunities for education as men. Over the past four decades, literacy programs have helped over 110 million women learn to read and write. In Chinese secondary schools, the percentage of girls has climbed from 25.6 per cent in 1951 to 41.9 percent in 1990. There has also been a drastic increase in the number of women who have attended institutions of higher learning. Shortly after the founding of new China, women college students were few. In 1990 however, there were 1.05 million female students attending colleges and continuing education centers. There is also a large number of women in advanced degree programs. In 1989, there were 18,000 women pursuing master degrees and 1,000 Phd programs in China.

The number of women scientists and technical personnel has risen to 8.09 million. Over the past few years, Chinese women scientists have attained a higher degree of academic achievements. This year, twelve of the 210 newly elected members of the scholarly committee of the Academia Sinica are women, representing 5.7 per cent of the total of new members, a 2.01 per cent increase over the percentage for 1984. A number of women scientists have held leadership positions for scientific research. In the Academia Sinica, there are 286 female directors or deputy directors of research laboratories, accounting for 11.9 per cent of the total. Other 514 women lead research teams, accounting for 14.8 per cent of the total number of team leaders. In the Chinese Academy of Medical Sciences, 47.3 per cent of the academy's 112 key research projects are led by women. In Chinese military services, several hundred women scientists are holding positions of, or higher than, project directors and directors of research laboratories. A considerable number of promising female scientists have become leaders in various fields of research and academic pursuits at universities and research establishments. In the high-tech area, women scientists are also on the cutting edge. They have made break-throughs together with their male colleagues in areas such as rocket launching, Antarctic exploration, high-energy physics and bio-engineering.

Chinese women athletes have attained remarkable achievements. They have repeatedly won top medals in major international competitions, winning glory for the motherland. During the Olympic games in Barcelona which just ended, three quarters of the 16 gold medals won by the Chinese team were won by women.

Chinese women also enjoy a higher degree of legal protection. Apart from the Constitution which stipulates principles for gender equality, the Marriage Law and law of Inheritance have also included such principles as marriage freedom, monogamy, gender equality in marital relations and in property inheritance, doing away with feudal practices for marriage and inheritance. There are provisions in the Election Law, civil and criminal codes which guarantee women's rights and interest. In order to provide more comprehensive and well-defined protection of women's rights and interest, and to ensure gender equality in a legal context, the fifth plenary session of the sixth national people's congress passed on April 31 of this year "A Law of the People's Republic of China Respecting the Protection of Women's Rights and Interest", specifying in precise legal terms women's political, cultural, educational, employment and property rights and interest, the right for the inviolability of the body, and marriage and family rights and interest. This is the first comprehensive and specialized statute which has ever appeared in China concerning women, which is a clear indication of China's concern for women's rights and interest. It also reflects the advantage of a socialist system and has enhanced Chinese women's devotion to the nation's modernization drive.

II. The Achievements by Chinese Women in Environment Protection

Today, environmental issues have focused international attention. Humankind is ruthlessly destroying the environment in its exploitation and defacing of Nature. The environmental destruction and the harm done to our home planet are immeasurable, which have already incurred the wrath and ruthless revenge of Nature. The encroachment of deserts, soil erosion, the greenhouse effect, acid rain and the drastic depletion of surviving species are evident signs. The population explosion and the irresponsible exploitation of natural resources have only worsened the environmental problem. Women play and important role that no others can do in the reproduction and development of humankind. They also tend to be more seriously affected by the deterioration of the environment. Therefore, the protection of the global environment and the survival and growth of humankind concerns every nation and the world's women. Every inhabitant of the planet earth, every nation and region on earth must share the common obligation and responsibility for humankind and the earth. China, a nation with a population of 11 billion, and Chinese women who account for half the population, have a large share of the obligation to environment and face a more serious challenge. Over the four decades after the founding of new China, Chinese women have done a great deal to improve the nation's ecological system and made remarkable achievements.

China has scarce forestry resources with only 12.9 per cent of land covered by forests. Deserts are advancing at a speed of 329,400 acres every year with 164.7 million acres of land under the threat of desertification. Soil erosion is worsening and drought, flooding and sandstorm alternates regularly in many areas. Women's federations at various levels have worked with local governments over the years to mobilize women in protecting forestry resources and tree planting, in an attempt at reforestation and to reduce the occurrence of natural disasters. In as early as the 1950s, there were tree-planting teams which consisted of women from the mountainous regions of Fujian and Shaanxi provinces. They were devoted to the reforestation of the national lands and their examples were followed by many women all over the country. Their achievements in forestation were widely known. I would like to mention in particular that a "Women's Green Project" under the sponsorship of All China Women's Federation and the Ministry of Forestry, was initiated in 1990 with wide participation by women of all ethnic nationalities and all walks of life. The project encouraged women to use available resources and by various means to start greening programs with women participating in tree-planting, meadow-growing, gardening and all other kinds of reforestation efforts. The project was aimed at improving China's ecological system and speeding up the reforestation. According to incomplete statistics from 1990, there were 130 million women involved in voluntary projects for tree-planting, greening of environment, barrier forests and improvement of environment. Over 100,000 "women's woods", orchards and tree nurseries were created during the process.

Water is indispensable in human existence and productive activities. Chinese women have also played an active role in tapping, purifying, reasonable use and protection of water resources. In the extremely arid Wulan Cabu district of Inner Mongolia where each drop of water counts, a method of drip watering for vegetables was developed by the local women. The method replaced the traditional irrigation practice and greatly reduced water consumption. In many areas, women have done a great deal in protecting the clean drinking water and in the reasonable use of water resources. Women have also proved a vital force in many projects ranging from improving the river systems to water conservancy. They have made their contribution to water conservancy and to the improvement of water resource in working with men.

In the area of developing alternative energy, women have participated in hydro-power projects, scientific methane-generating, development of solar and wind energy and in programs for reducing energy consumption. The efforts by women in Zhejiang province are particularly notable. Over the past decade, women scientists there have undertaken research, design and management for methane-generating programs and the development of solar and wind energy. They have also promoted the use of fuel-saving stoves. Their achievements ar extraordinary. The methane-generating technology made it possible to create methane gas for cooking through a compost process utilizing animal manure and organic waste water. It helps eliminate pollution, keep water clean and improve living environment in the villages.

In disaster relief work, women's federations at various levels have been rallying points and a unifying force for women. Of particular significance is the summer of 1991 when many of China's southern provinces were hit by floods of rarest severity. Under disaster conditions, women showed astounding courage and faced the challenge of the floods in the same manner as men. Women's federations and officials organized women villagers to treat water for drinking, repair pumping facilities and prevent disease in the aftermath of flooding. Their strenuous efforts produced remarkable results. They proved to be effective and determined in helping the government resettle people made homeless by flooding, in resuming production and rebuilding of homes.

It has been known that the destruction of natural human habitat is half caused by industrialization and half caused by poverty and ignorance. To developing countries, poverty and backwardness are major factors that cause the deterioration of the environment. Therefore environmental protection must be aligned with programs of economic development and social progress. Since the start of the reform in China, economic progress has focused national attention. The growth of agriculture and economic prosperity has improved conditions for environmental protection. The All China Women's Federation has therefore called on women all over the country to play an active role in economic construction. In 1989, a project to encourage rural women to learn technical skills, achieve literacy and try to do better than others at farm work and other trades was initiated. The project has achieved remarkable success over the past three years. More than 120 million all over the nation have participated in the project. 96 million women received various forms of technical training, with 80 per cent of them acquiring at least one useful skill that brings greater income, and 240,000 have become rural technicians. In areas with grain, cotton and rape seeds as stable crops, women have taken part in various programs to increase production on a massive scale. Women have taken part in other agricultural development projects to expand silkworm breeding, poultry farms, vegetable production, forestry and orchards and in projects aimed at relieving poverty. Their efforts have contributed to greater rural prosperity.

Population growth has had a serious impact on environment. A balanced relationship between population, natural resources and environment is key to the continuous, steady and balanced development of economy and society. The endeavor and achievements by the Chinese government and women's federations at various levels in controlling the population growth are most evident. During the 1970s, China began to implement a positive population policy. Family planning became an important fundamental policy for the nation, which has so far slowed population growth. The natural growth rate has been kept at bay at 11-14 per cent, which is lower than the world average. On the other hand, the country has promoted policies for eugenics and better child care so as to improve the quality of the general population. The government and women's federations have attached great importance to health care for women and infants, and have promoted standard delivery, prenatal care and postnatal monitoring which have reduced the mortality rate for child-bearing women and prenatal mothers to O.05 per cent and for newborn babies to 26.65 per cent. Women on the whole have been most cooperative to the family planning policy and have adopted safe contraceptive and sterilization methods. They are also gradually accepting or adopting policies for eugenics and better child care. The pressure of population growth has also been elevated to some extent by women's involvement in efforts at solving the problem.

The fundamental solution to China's environmental problems and development lies in science and technology. Scientific and technological advancement can greatly enhance productivity, making it possible to curb population growth and improve population quality. It can also turn potential resources into real resources, creating a basis for developing the use of environmentally friendly resources. The stabilizing of environment, pollution control and the protection of ecology must rely all the more on the development of relevant technology. The contribution of science and technology to environmental protection is dependent on scientific and technological personnel. Women scientists have made their due contribution to thee modernization of China and attained remarkable achievements particularly in such environment and development-related areas as environmental protection and family planning. Quite a few laboratories in environmental research of well-known universities and research institutions are led by women. Women scientists are involved in such environmental research projects as reduction of ocean pollution, prospecting of mineral resources, technology for reducing traffic noise and genetic engineering for improving agricultural environment. As for research and services in medicine for women and infants, family planning and contraceptives, women researchers and administrators constitute a majority. They have played an important role in RD in these fields, undertaking many key research projects designated by the the previous "Five-Year Plans" covering a fifteen-year period. They have contributed to controlling the population growth and improving population quality in China.

III. Encouraging Greater Involvement by Women to Secure a Better Tomorrow for China's Environment and Progress

Because China is a developing country, women's participation in environmental protection and progress is all the more important as it already faces a difficult task for eliminating poverty and promoting progress. However, in areas ranging from decision-making for scientific and technological matters, industrial management, production of rural programs, participation by women still falls far short of requirements of the national economy and social progress. In order to encourage greater involvement by women in China's environmental protection and continued progress, we will try to secure their participation by instituting provisions in regulations and planning. We may, for example, include the requirements for women's participation in the plan for national economy, so as to plan, organize and arrange for women's participation. We may give full consideration to women's involvement as an important factor in the balanced development of th economy, society and environmental protection for experimental projects in balanced development.

In the meanwhile, we will utilize all media resources available to us to improve the public education of women so as to enhance women's awareness of environmental issues on a popular basis. Women play an important role in the care and upbringing of future generations, have a more intense hope for a better future and care whether our children will live in a favorable environment to have their children. To enhance women's awareness for a pollution-free global environment and concern for the fate of earth and progress of mankind is precisely the area where we should concentrate attention and efforts. Training and public education for women will be beefed up to promote an understanding that environment and natural resources are the basis for survival and growth. They will also acquire a balanced view of immediate gains vs. long-term benefit and local interest vs. benefit for a larger context. We will also include in our education a subject for national studies which should incorporate education on population and environmental issues. In this way, the stabilizing of the environment can become a voluntary action by all women and a noble cause upheld by the whole nation.

An awareness of global environmental issues is dependent on the general education level of society and on the collective quality of women. We have always paid much attention to the enhancement of the scientific and cultural quality of women and regard the work as of strategic importance. The All China Women's Federation has promoted a "4-S" principle among women of China which includes self-respect, self-confidence, self-independence and self-endeavor. By instilling the "4-S" spirit, women will be more actively involved in social progress, be more committed to obligations for environmental protection and make greater contribution to creating a better environment.

We will also improve our organizational work and incorporate environmental protection into major programs of national scale. The "Women's Greening Projects" which have become popular in the nation should continue to expand in scope and depth. In annual citations of women who achieved excellence in their work, attention will also be given to those women and organizations which have made outstanding contributions to environmental protection, so that more women will get involved in environmental protection and in projects for the greening of the country.

IV. Cooperation by World's Women is the Only Approach for Women's Greater Role in Environmental Protection and Continued Progress

The stabilizing environment and continued progress are matters of common concern and a shared objective for all mankind. Cooperation in these areas has the greatest potential. Close international cooperation is indispensable in solving global environmental problems and controlling the deterioration of regional environment. The Chinese government has repeatedly stated its desire for international cooperation in environmental protection and continued progress. The Chinese Prime Minister remarked at the Conference for the environmental ministers held in June of 1991 in Beijing, that "the developing countries, whose population amounted to a great majority, share a common economic background and objectives for development. In the process of solving environmental and development problems, they should learn from each other, cooperate and coordinate global actions.

Because of the significant participation by women in global environmental protection and sustained progress, the exchange and cooperation by world's women on women's participation are therefore highly necessary. Women's participation in development and their concern for environmental issues are relatively new. Women should exchange ideas and experiences so that the experiences can become part of a shared treasure house. Meanwhile, exchange will also make it possible for women to be close to each other and work out the differences in their opinions and to enhance their determination and confidence. The cooperation of women on projects of common concern will create a greater and longer-lasting impact for women's participation in environment and progress. The Miami Conference in November 1991 and this Symposium in Beijing area already good beginnings for such cooperation. The Fourth World Women's Conference will be held in Beijing in 1995 with more than 15,000 delegates expected from all over the world. The conference will offer opportunities or extensive discussion and exchange on the present status and future of world's women. It will be of crucial importance to the development and progress of Chinese women and women of the world. We welcome all our friends present here to come for the event to continue our discussion on women's participation in environmental protection and progress.

In order to make the planet earth green, peaceful and prosperous, the women of China are prepared to work together with women of thee world, regardless of what social system they are from, their ethnic origins, religion, and creed, for the common interest of mankind and its future.

ANNEX III

Interregional Workshop on the Role of Women in
Environmentally Sound and Sustainable Development
9-15 September 1992
Beijing, People's Republic of China

AGENDA

1. Opening of the Workshop

2. Election of officers of the Workshop

3. Adoption of the agenda

4. Results and follow-up to UNCED

5. Methodological approaches towards strengthening the role of women in environmentally sound and sustainable development

6. Chinese experience in promoting the role of women in sustainable development

7. Women, environment and sustainable development

   (a) Introduction of the theme by INSTRAW
   (b) Women and population as a factor in sustainable development
   (c) Women as environmental managers and decision makers

8. Country and regional experiences on women, sustainable development.

9. Integrated approach to women and sustainable development of natural resources

   (a) Role of women in small scale mining
   (b) Women and water-related sustainable development
   (c) Role of women in the use of new and renewable sources of energy

10. Development of guidelines on strengthening the role and participation of women; formulation of generic programmes/projects linking women, environment and multi-sectoral development.

11. Financing of programmes/projects linking women and sustainable development

    (a) Restructuring budgets to achieve sustainable development
    (b) Financing for sustainable development

12. Discussion and adoption of Workshop report

13. Closing of the Workshop.

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